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News & Reviews

GAMES NEWS 16

After Mad Max II prepare yourself to meet Mad Martha, the bane of hen-pecked husbands everywhere. A domestic adventure? Well hardly. Frenzy features a frantic chase between a gontilla and the neighbourhood carpenter. Plus all the latest software releases.

VIDEO SCREENS 24

A new challenge for fiddle of the Spitz owners. We deliver the depths of Activision's terrible Pit.

ARCADE ACTION 30

Meet Donkey Kong Junior a heroic chip off the old block, with a rescue mission to perform. Find out about the night-mare creatures which inhabit Monster Bash. And improve your Golf play.

REVIEWS 98

Hunting Pink Elephants!

Listings

STAR GUARD 32

You can tell it's almost Christmas. Even the aliens are getting into the festive spirit and seeking out exciting new gifts. Trouble is these "gifts" are space pods and they belong to Apple owners. Can you stop the aliens getting their tentacles on them?

ALIEN CHASE 38

Catch those runaway aliens on your BBC model B. But you will have to be quick. These little green men are pretty nippy!

YACHT II 42

Too many aliens so far? Well this game will bring you back to earth. It's a version of that popular dice game, Yahtzee, written specially for the ZX81 with all the challenges of the real thing built in.

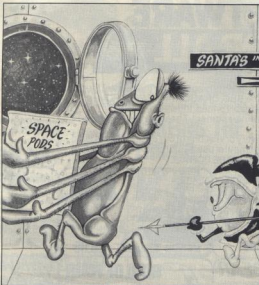


DOG FIGHT 62

Bandits at 12 o'clock skipper, and they are coming out of the sun! It's chocks away for an exciting version of this arcade game for the Vic-20.

GLUTTON 66

Definitely not a game to be played between meals. Munch your way around a maze but keep your wits about you.



SPACE ROLLER 46

Different — that's the word for this Spectrum spectacular. It involves a little man painting white lines and heat seeking missiles. Yes really! Try it out and you'll see what we mean.

GRANNY 48

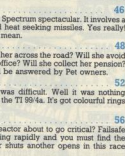
Will Granny find someone to help her across the road? Will she avoid a ducking on the way to the post office? Will she collect her pension? All these questions and more will be answered by Pet owners.

HUNGARIAN HEX 52

You thought Hungarian Squares was difficult. Well it was nothing compared to this brain-twister for the TI 99-4a. It's got colourful rings of confusion past to baffle you...

AIRLOCK 56

Can you escape from a nuclear reactor about to go critical? Failsafe devices are sealing off the building rapidly and you must find the quickest way out — as one door shuts another opens in this race against time the Atari 400/800.



Bright Sparks...

Electronic toys and games are already eating their way into the prime commercial TV time slots in anticipation of a bleeping barking bumper Christmas.

From radio-controlled wonder cars to an abundance of games-playing time pieces, we take a buyers' look at how to approach this booming market. What to watch out for, what prices you should shop around to get and some of the best buys in each category.

Read it before you plan your stocking fillers this Christmas. It starts on page 85.

Also included in our Christmas Stocking section is a rundown of the chess machines you could buy this Christmas. How they compare with each other and with the chess programs you could buy for a home computer.

Features

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Problems solved, questions answered, views expressed.

COMPETITION 11

What won our Program of the Year Competition? Find out on this page.

CHESS 27

Teach your computer end game expertise.

BUGS 28

It's Christmas and something awful lurks under the fairy lights.

THE SEVENTH EMPIRE 72

A competition comes in February. So strange, so unique. It is taking us three issues to tell you about it. This month sets the scene.

ADVENTURE 75

Keith Campbell's a brave man. He's ventured back into The Asylum.

GO 77

Taking liberties on the Go board.

MACHINE CODE 78

Do you yearn to produce games as fast and thrilling as those in the arcades? The first steps on that path begin here.

PRACTICAL PROGRAMMING 80

The last in the series. Ted Ball plans for strategy games.

GRAPHICS 83

Where technology will take us next.

SANTA'S CHOICE 85

An inside view on what to buy and how to choose an electronic game or toy this Christmas. Plus chess machines and a look at TV games centres.

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J.R.

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TONIC FOR THE TROOPS

Dear Sir,
I am at present serving in the Falkland Islands, working out of Port Stanley.

We are trying to get a computer club started in the evenings to try and eliminate some of the boredom of off-duty hours. At present we have limited facilities — 2 ZX81 Sinclair computers — and no recognised instructors.

Could I therefore ask you for some back issues of your magazine to assist us with our club, plus any other information/leads that may be of use to us?

SSgt Brown
30 FD SQN R.E.
BFPO 666

Editor's reply: Those back numbers are at this moment winging their way to you SSGT Brown. We hope they'll be useful in setting up your club.

ADVENTURER NEEDS HELP!

Dear Sir,
I would like you to print this letter because if so it will — hopefully — provide me with an answer to a question that has been niggling me for months. It concerns the game *Ulysses* and the *Golden Fleece* produced by On-Line Systems.

So far, for three frustrating months I have been plodding around the opening scenario without proceeding on to the second stage. I have tried everything, wandered round the forest for the day, pounding the shopkeeper with questions, threatening the guards with death — mine! — and still have not got into the King.

So please, please, I beg, any Apple owner out there

with the game and who have passed the first stage, please write into *Computer and Video Games* as soon as possible. Thank you! I wait eagerly.

Keep the Apple games coming — Imphotepe and Alien Lemmings were excellent.
Michael Tallent,
Langport,
Somerset.

BOMBED OUT BOMBER!

Dear Sir,
I have just received the September issue of *Computer and Video Games* and I have typed into my 32K Atari 800 the program called *Bomber* only to find that it did not run. The program has been written or converted in such a way that it will only run on a 16K Atari.

I have converted it so it will run on any memory size Atari. First add lines
0 GRAPHICS 0 :REM CLEAR SCREEN.

8 DL = PEEK(560) + 256*PEEK(561) :REM (Find number of top left screen location. This varies with different sizes of memory).

Then change lines 10, 70, 80, 130, 190, 250, 310, 440, 450, 500, 560, 630, 690, 910 and 1030.

In these lines you will find the numbers, 15745, 15764, 15923, 15943, 15965, 15983, 16003, 16183, 16205. Change these numbers to: 15745 TO DL+383, 15764 TO DL+372, 15923 TO DL+531, 15943 TO DL+551, 15965 TO DL+573, 15983 TO DL+591, 16003 TO DL+611, 16183 TO DL+791, 16205 TO DL+813.

G. A. Ferguson,
Darlington,
County Durham.

POKEING THE TRS-80 . . .

Dear Sir,
Here are some pokes for the TRS-80. I found them in the *Basic Programmers Notebook* by Earl R. Savage.

POKE 16396,23 — disables break key.

POKE 16396,201 — enables break key.

POKE 16396,165 — replaces break with shift break.

Bypass 1 for printer.

10 POKE 16423,57:POKE 16423,0.

Line 10 causes the TRS-80 to automatically bypass all the statements which address the printer.

Bypass 2 for printer 20 POKE 16414,141:POKE 16415,5.

Line 100 is the screen bypass.

Line 200 resets line 100.

200 POKE 16414, 88:POKE 16415, 4

The book has many more 'tricks' for the TRS-80, I recommend it.

Sunil Parekh,
Eccles,
Manchester.

PLEASE, LET'S STAY SHARP

Dear Sir,
I have become rather disturbed of late by what seems to me to be a running down of interest in the Sharp MZ-80K both in advertising and articles on this splendid machine.

You have featured the MZ-80K in the *Hardcore* section,

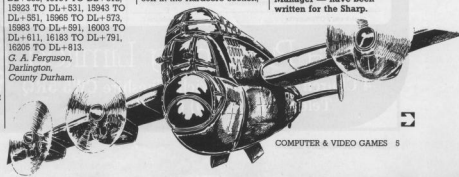
but really this is preaching to the converted and is of no use to someone who is already an owner.

I wonder if any of your readers would be able to supply games converted from another format? I am particularly interested in the 747 Simulator, which is only available for TRS-80-Genie owners.

In conclusion, I realise that you cannot provide listings for every machine every month, but it does seem that a lot of space is taken up with new machines i.e. Spectrum and BBC etc and no doubt we will be flooded with Dragon articles. Please remember that there are specific mags for these machines, and people such as myself depend on you, in the absence of a Sharp Users magazine.

J. D. Carson,
Lurgan,
Co. Armagh

Editor's reply: You are in luck Mr Carson, a letter came into our office the other day from a group of people who are considering starting up a Sharp users magazine. The subscription rate would be between £4 to £6 and the magazine would be bi-monthly. The person to contact is Mr J. P. Griffiths, 104 Waterloo Road, Southport, Merseyside. And may we respectfully remind you that some of the best games we have published — for instance *World Cup Manager* — have been written for the Sharp.



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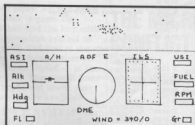
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MAILBAG



RATTLE AND ROLL!

Dear Sir,
A simple technique for gamers and their ZX81's — add to the effect of an explosion to produce results similar to an earthquake scene on TV — the jolted camera shot — get it?

By POKEing location 16424 you can cause the picture to judder in an alarming way — the higher the value the more alarming it gets — my program demonstrates this. 10 PRINT AT 10,10; "— □□"

20 FOR N = 50 TO 0 STEP — 5
30 POKE 16424,N
40 POKE 16424, (50 — N)
50 NEXT N
60 GOTO 10
D. Beighton,
Sitchester,
Reading.

CHARACTER PROBLEMS

Dear Sir,
Could you please tell me how you get lower case characters printed on the television screen using a Vic-20. I have tried desperately but to no avail.
Alan Clarkson,
Warrington,
Cheshire.

Editor's reply: All you have to do Alan is press the SHIFT key and the key with the Commodore symbol on it — you'll find that at the bottom left-hand corner of your Vic keyboard — at the same time. Then you'll find both upper and lower case characters are available.

MISLEADING MEMORIES

Dear Sir,
I wonder if any of your correspondents or staff have been slightly misled, as I was, by some advertisements for microcomputers, as far as the available RAM is concerned. I purchased my Atom as much for its expansion possibilities as anything else, but I also felt that 2K of RAM was a fairly

generous offering for starters.

I soon discovered that 1K of that RAM is in zero page and dedicated to the operating system, except for a few odd bytes. Another 1K is the screen memory, leaving just 1K for program text! Even with the Atom's fairly compact abbreviations fitting a reasonable game into 512 bytes is rather frustrating. I now have a full expansion for the lower text space, but for several months the frequent appearance of ERROR 248 was a cause of great tearing of hair and gnashing of teeth!

I wonder, when I see adverts for some of the latest machines, such as the Spectrum (48K) or the Dragon (32K), just how much of that RAM is directly available to the user for program text. Perhaps your Hardcore article could publish a comparative table sometime.
Richard Gledhill,
Bicester,
Oxfordshire.



THE MICRO CONFLICT . . .

Dear Sir,
I felt I just had to write to you and your fantastic magazine, and have a short say in the ZX Spectrum versus the BBC model A conflict.

As far as I am concerned, the Spectrum is one of the greatest achievements in the computing industry. If I were to give you about £350 and also the choice of buying a BBC model A micro at £300 or a 48K Spectrum, costing a mere £175, a ZX microdrive at £50, a ZX printer at £80, an RS232 at only £20 and if you wanted a proper keyboard at about £40, which would you take?

I think the choice is obvious and I know that if I

had £300 to spend on any computer, the Spectrum would be first on my list.

Finally, it is my belief that Sinclair make the world's best computers, and ITV make the world's best television programmes!

I would be grateful if you would publish this letter with the hope of clearing a few minds of the endless quibble between the Spectrum and BBC computers.
Alan McAuley,
Carrickfergus,
Co. Antrim.

VIDEO FAN SPEAKS OUT

Dear Sir,
Since finding your magazine in my local W. H. Smiths back in November last year, I have been buying it regularly every month.

Computer and Video Games fills a unique spot amongst all the computer-related magazines, dealing more with the fun side of computers, than boring us with the latest technical guff, which most of the others do.

I don't in fact own a computer as such, but am the proud owner of an Atari, VCS, and find your Video Screens reviews very interesting.

One request, how about doing a complete run down on the Atari VCS? as I feel sure there are many VCS owners who don't really know much about the history or technical side of the VCS and would like to.

Mark Gentry,
Ipswich,
Suffolk.

SPECTRUM SPECIFICS

Dear Sir,
Having read a lot about the Spectrum several questions still remain in my mind.

Does the screen still flash when the 'Pause' command is used?

When saving and loading a program is the screen display retained or does it behave in the same way as that of the ZX81?

On Sinclair's order form both a "User-defineable

character set and "User-defineable graphic characters" are mentioned. What is the difference?

When a sound is generated does the program stop until the sound has finished? And finally is it possible to set up files on cassette?
Jason Orbaum,
Surrey.

Editor's Reply: No Jason, the screen does not flash when the Pause command is used. The screen contents are retained when saving and loading, and there is no difference between the "characters" mentioned in Sinclair's publicity. A program does not stop when sound is used, but it will slow slightly, and yes, it is possible to set up files.

REVIEWERS REVIEWED

Dear Sir,
I have just received my Dragon 32 computer and would like to offer my services for reviewing games for this machine.
Paul Whitby,
Gloucester.

Editor's reply: We are still short of reviewers for the Dragon 32 and Texas 99/4A computers. If there's anyone out there who has a printer with their computer please write to us.

IT'S DRIVING YOU WILD

Dear Sir,
I noticed in your November issue that some people were having difficulty with Wild Strawberries. If they are trying to load it from disc they will experience some problems as some of the POKE commands disrupt the game.

The lines to be changed are: 65 where POKE 10240 + A should read POKE 38912 + A. The same change should be made for line 70. 75 should be changed to make POKE 10448 + A read POKE 39210 + A. 100 should be changed to make POKE 786,40 read POKE 756,152.
Philip Sadler,
Acton.

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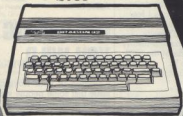
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GAME OF THE YEAR WINNER

Those ravenous little devils, the Nibblers, which appeared in the very first issue of *Computer & Video Games*, have finally done some good.

They have won their inventor, Paul Jay, a trip to Paris for two, complete with spending money, courtesy of *Computer & Video Games*.

After careful consideration and much heart-searching by our panel of judges, Paul's Nibblers was voted the winner of our first Games Program of the Year competition.

Nibblers won because it was a simple but original idea, which included different levels of difficulty, sound and graphics. It ran smoothly and proved easy to key-in but compulsive to play.

So congratulations to Paul and commiserations to all those of you who held out high hopes of Paris in the Autumn.

And for those of you who have not yet had a chance to meet The Nibblers, we will be printing a Vic-20 listing we received which was converted from Paul's game.

Congratulations to all you master-

minds out there who solved our first Puzzling challenge from the November issue.

But judging from the many phonecalls we received about Puzzle C we may have been too clever.

We changed one of the pages in Puzzle C to make it impossible and this obviously confused some of you, but most managed to come up with the right answer.

The correct solutions were — reading from the bottom of the page up:

A) Red, Red, Yellow, Yellow.

B) White, Green, Black, Red.

C) Impossible.

D) Red, White, White, Black.

The three winners will be announced next month.

THE EMPIRE STRIKES OUT

The Seventh Empire is a unique game and competition which will be starting in *C&VG's* February issue. It is a computer moderated game specially designed for *C&VG* by Mike Singleton.

Every player will control one of the galaxy's many tribes with seven space fleets to despatch around the star systems taking part in the empire battles for a share in the

spoils, initiating your own raids and acts of piracy.

It will accommodate from 1 to 10,000 players with a winner being the player with the most points scored each month. Top scorer in the first month's game will win a Colour Genie Computer.

The first 1,000 readers we hear from will enter free, the rest will be asked to pay a token 50p charge but after that first turn, Seven Empires will only cost you a stamp every month.

Fill in the form below and rush it to: The Seventh Empire, *Computer & Video Games*, 8, Herbal Hill, London EC1R 5JB. Although you can enter the game any time, you will need to be on our records before the February issue goes to press in order to enter that first month. See page 72 for the background to the game, the rules come next month.

Please include me in The Seventh Empire competition which will run in your February issue.

The name of the tribe I wish to control is:

My name is

Address:

.....

.....

.....

Tel:

NEXT

MONTH

Take to the War Path in the new year with wargames author Ron Potkin.

Ron was the writer of our April issue star game, *Kriegspiel*, a chance to take your computer's Panzer divisions in a tank battle scenario.

War Path has a Wild West theme which gives the Indians every chance to reverse history. It also maps out Ron's unique Big Screen approach to computer war-gaming.

Instead of printing out the listing for one machine, Ron will be taking you through each part of the program, month by month, explaining how the Big Screen technique works and showing how it can be utilised on many different computers.

War Path kicks off our new year and provides some marvellous lessons in making the most of computer memory and TV screens.

The Seventh Empire rules are

printed in the January issue. So all you budding fleet commanders should pick up a copy to find out how to partake in galactic warfare, make piracy work for you and play-off one warring empire against another.

The latest news from the *C&VG* special Starweb game comes from one of the more threatening of the galactic races, the dreaded Gzinti berserkers.

Mark Woolwich who has been following the growth of the Gzinti empire closely managed to intercept the following transmission on its way to their home world of Gzin.

The rate of expansion mentioned in previous reports has slowed greatly due to conflicts with other races on the thrice removed frontiers.

The powerful and hostile Pirate 1 is being kept out of Gzinti territory. His scout fleets are destroyed by our border fleets who are taking minimal damage.

Artifact Collector 1 has proved to

be non-hostile and information received from him concerning Pirate 2 has resulted in our strengthening of the border between Gzin and Pirate 2. Furthermore a large force has been mobilized with the intent of destroying Pirate 2.

Artifact Collector 2, after being initially hostile, has retreated, as large force is pursuing him with the aim of neutralizing his threat. A time and labour-consuming job, but vital to ensure continued expansion and replacement of lost ships.

The fleet drawn into the black hole has remained silent and must be considered lost. However, the black hole provides a barrier to attack from regions beyond it.

The prime directive is never forgotten, non-robot population is destroyed wherever ships can be spared, though the needs for our survival and supremacy often conflict with it.

End of report.

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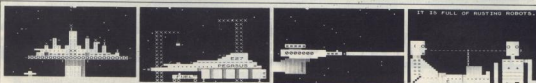
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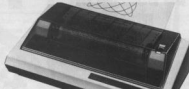
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NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS GAMES NEWS

ALIENS WILL GIVE YOU THE SHAKES

KAMIKAZE ALIENS

Aliens are zooming down towards planet Earth with suicidal determination. They will crash into your ship — killing themselves and taking you with them without a pause for thought.

These kamikaze aliens are launched from the mother ship which zaps back and forth across the top of the screen sending a deadly rain of little green men down at your defenses.

Shoot fast to stay alive in this new Vic game from Audiogenic. The game is obtainable from the Reading-based firm at £7.99.

Another new space theme game from Audiogenic this month is *Satellites and Meteorites*.

You are the commander of a meteorite destroyer ship on a mission to neutralise a storm of meteorites that are threatening your planet.

The only way to destroy the giant rocks is to blast them with your lasers — dodging the ones you cannot get in your sights.

Your mission is made more difficult by a squadron of enemy satellites which fly in after the meteorites.

If you survive the meteorites and the satellites you must then avoid the black hole to complete your mission.

Satellites and Meteorites is a cartridge game and plugs into the back of your Vic. Available at £24.99.

THE HAPPY EATER IS STILL BITING

GOBBLEMAN

Gobbleman, Munchman, Munchman, Snapper — even Munch 'n' Crunch. Come on guys — let's have some more original names for Pacman style games! Better still let's have some original and exciting new games.



Meanwhile, back in the maze, the ghosts and the little yellow disk with the insatiable appetite are running around the circuits of the Sinclair Spectrum. Gobbleman is fairly close to the arcade version although it does not feature the cage at the centre of the maze.

The game is the latest addition to the Artic computing range of games for the Spectrum. It is available from the Hull-based firm at £4.95.

The range also includes a high resolution graphics version of *Space Invaders* at £4.95 and a Chess tape with seven levels of play at £9.95. All games will run on the 16K or 48K Spectrum.

THEY CAME FROM THE ARCADES...

ARCADIANS

Two new games based closely on arcade money-spinners *Asteroids* and *Galaxians* are the latest offerings from Acornsoft for the BBC Model B.

Arcadians — the *Galaxians* clone — looks almost identical to the arcade version and, if its anything like Acornsoft *Defender* it will play as well as the arcade version too.

The *Asteroids* type game is called *Meteors* and again is a close copy of the arcade version with the added improvement of colour.

The games are available from Cambridge-based Acornsoft at £9.95.

AXE MAN MEETS THE MONSTERS

ESCAPE

Escape is the name of the game in a 3D maze full of prehistoric monsters.

In order to escape from the maze you must first find an axe that is hidden somewhere in the maze. You need this to get through the

blue door to freedom.

The monsters track you at half your speed until you find the axe. This heavy weapon slows you down considerably and you may need to drop it in order to make a quick get away before you get through the blue door.

There are five different skill levels in this game — these change the number of monsters chasing you. It is also possible to alter the speed of the monsters.

Escape runs on a 16K Sinclair Spectrum and is available from Bristol-based New Generation Software at £4.95.

THE GAME OF MANY WORDS...

SCRABBLE

Scrabble fans will welcome this computerised version of the popular word-making board game.

The game is exactly like the board game except you must put your wits against the computer. There are four skill levels — from easy to downright impossible and the computer keeps the score.

Scrabble runs off a disc for the 48K Apple and costs £24.95 from London-based Little Genius.

CHAMP OR CHUMP ON THE TRACK?

CARS

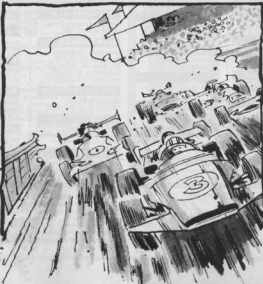
Bring the thrills and spills of the grand prix track to the keyboard with your Sharp MZ-80K.

You could become a world champ in *Cars*, the latest racing game for the computer.

Nine gears help you to accelerate around the twists and turns of the race track.

But its not only acceleration you'll need if you want to pop the champagne at the end of this race though. You must have quick reactions to steer in and out of all the other racers.

Cars is the latest game from Sharpsoft for the MZ-80K. It is available at £5.00 from the London-based company.



NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS NEW GAMES NEWS

HEN-PECKED HERO IS ON THE RUN!

MAD MARTHA

Poor little Henry is the hen pecked hero of this domestic tale.

One night Henry can take no more. He steals his wages from his wife's purse, sneaks out of the house being careful not to wake the baby or trip over the cat, and heads for the bright lights to have some fun.

Trouble is he runs out of money. His only way to raise some cash is to gamble his few remaining pounds on the spinning wheel of the roulette table.

Just as Henry is getting into his evening at the tables his wife — Mad Martha — has noticed his absence. Realising Henry has absconded with the housekeeping she sets out after him with an axe.

Guess what part you play in this happy little tale? That's right, you are Henry. Watch out for that axe!

Mad Martha runs on a Sinclair Spectrum or ZX81 in 16K and costs £5.95 from Swansea based Saturnsoft.

Also new from Saturnsoft this month are two adventure games for the Spectrum or the ZX81.

Mines of Saturn challenges you to find the hidden crystal mines and then escape with the goodies. If you succeed, then you are ready for a stiffer challenge — to find your way safely back to planet Earth.

Mines of Saturn and Return to Earth are available from the Swansea-based firm at £4.95 for the ZX81 versions and £5.95 for the Spectrum — with a pound off if you purchase both games.



MEANWHILE OUT IN DEEP DARK SPACE

SPACE PHREEKS

Space Phreeks challenge you to fight them as you journey through space — a lonely traveller in time, the last survivor of a once proud planet called Earth — now just a cloud of cosmic dust floating in the space winds.

Your space ship moves right and left across the bottom of the screen as assorted aliens swarm towards you — some of them firing missiles as they approach.

Space Phreeks runs on the expanded Vic and costs £9.99 from Harrow based Rabbit Software.

Another new game from Rabbit this month is a version of the popular arcade game Centipedes. It features the spiders, beetles, bugs, and mushroom field just like the arcade version.

You must also be careful of the

'Gobblers' which travel along the bottom of the screen. Remember you cannot shoot them — you have to dodge them.

The game also runs on the expanded Vic and requires joysticks to play. This also retails at £9.99.

The third game from Rabbit this month is a version of the arcade game Frogger — again running on the expanded Vic at £9.99.

IT SHOULDN'T HAPPEN TO A BRICKIE!

FRENZY

Swing that hod of bricks onto your shoulders and set off up the ladder to the next row of scaffolding.

This is your chance to be a big butch bricklayer for the afternoon — flexing your muscles, swearing like a trooper, and

whistling at the girls.

All you have to do is carry the bricks to the next level. But watch out, this is no ordinary building site and there are two monsters stalking the scaffolding — hungry to get their teeth into any passing hunks of beefcake.

If you successfully deliver your hod of bricks and manage to avoid the monsters you go on to a new more difficult level of play. This time there are two, and then four, and then six monsters.

Frenzy runs on a Tandy Model 1 and III and on a Video Genie 1 and II. The game can be obtained from East Sussex based Molimerx at £9.78 inclusive.

GUNNING FOR ALL THOSE TOP NAMES

PESTEROIDS

Do you think your computer is better than any other computer on the market? Or do you have a pet hate — a computer that has behaved badly?

Either way this game offers you the chance to blast the company logos of a selection of rival computer manufacturers.

They are all out there — waiting to be gunned down. From Apple to IBM you can take pot shots at them all. The game is based on the arcade game Asteroids and features the familiar command ships and hyperspace associated with this game.

PS Pesteroids runs on the TI 99/4a and is the latest game from Stainless Software of Stockport. The game is available at £9.00.

Also new from Stainless this month are two adventure games — Octal 1 and Keys to the Castle — on offer at £9 for both. Separately they cost £4 for Octal 1 and £7 for Keys to the Castle.

Illustrations: Jon Davis



MICHAEL ORWIN'S ZX81 CASSETTES

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Richard Ross-Langley,
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machine code:

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Basic:

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Ten games in Basic for 16k ZX81

Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.

Cassette 2 costs £5.

CASSETTE 3

8 programs for 16k ZX81

STARSHIP TROJAN



Repair your Starship before disaster strikes. Hazards include asphyxiation, radiation, escaped biological specimens and plunging into a Supernova.

STARTREK This version of the well known space adventure game features variable Klingon mobility, and graphic photo torpedo tracking.

PRINCESS OF KRAAL

An adventure game.

BATTLE Strategy game for 1 to 4 players.

KALABRIASZ World's silliest card game, full of pointless complicated rules.

CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.

SECRET MESSAGES This message coding program is very tricky!

MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.

Cassette 3 costs £5.

CASSETTE 4

8 games for 16k

ZX-SCRAMBLE (machine code)



Bomb and shoot your way through the fortified caves.

GUNFIGHT (machine code)



INVADERS (machine code)



FUNGALOIDIS (machine code)

GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft.

SNAKEBITE (machine code)

Eat the snake before it eats you. Variable speed (very fast at top speed)

LIFE (machine code)

A ZX81 version of the well known game.

3D TIC-TAC-TOE (Basic)

Played on a 4x4x4 board, this is a game for the brain. It is very hard to beat the computer at it. 7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman).

Cassette 4 costs £5.

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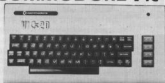
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Fast and furious action is what you get in this amazing Defender-style program for the ZX-Spectrum.

ORBITER is written entirely in m/c code and has full arcade features, including scanners, reverse, hyper-space, continuous scoring and sound effects, plus humunds, landers, mutants and all the other alien nasties. 16K or 48K Spectrum £5.95.

GROUND ATTACK

Survival is the name of the game in this exciting Scramble-type arcade game for the ZX-Spectrum.

Your mission is to pilot your spaceship through tortuous caverns while destroying the enemy missile launchers and fuel dumps.

GROUND ATTACK is written completely in machine code. And has full arcade features including lasers, bombs, explosions, continuous scoring and sound effects, plus humunds, landers, mutants and airborne aliens. 16K or 48K Spectrum £5.95.

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NEW PRODUCTS NEW PRODUCTS NEW PRODUCT GAMES NEWS

THIS GAME WILL SLAY YOU!

DRAGON QUEST

Seek out the dragon and slay it. This is your task in a new Adventure game based on the popular fantasy game *Demons and Dragons*.

The game displays text and graphics and challenges you to gain a thousand points before you can go on to level two. The authors of the program are confident that level one will keep you occupied for quite some time. So confident in fact that level two is not yet on sale.

Dragon Quest runs on a BBC model B and costs £11.50 from the Marseyside software house Bug Byte.



Also new from Bug Byte this month is a fruit machine game with many of the features of the old end-of-the-pier favourite. The game features spinning wheels with all the fruits and hold and

nudge features. A torrent of pennies are depicted tumbling from the front of the machine when you get a winning line.

Fruit Machine runs on a BBC model B and is available at £5.50 from the Liverpool firm.

BATTLE TO REACH THE FORTRESS

SCRAMBLE

Hover above the missiles and bomb the fuel dumps. Sounds familiar — yes, you guessed it, it's another version of the arcade winner — *Scramble*.

This latest version on the Sinclair Spectrum in 16K or 48K and features four levels of play.

First there are the ground-to-air missiles, followed by the spiraling UFOs, and then the fast and furious meteorites.

If you survive this onslaught you can go on to attack the Fortress.

If you successfully destroy the enemy fortress the game starts again at a new more difficult skill level.

Scramble is the first Spectrum game from the Berkshire-based software house — Mikro-Gen. It costs £5.50 plus 40p postage and packing.

Beware the Deadly Imposters

MARTIANS

The Martians are invading. They rely on stealth and sheer numbers to overcome you.

Armed only with a force field you must attempt to catch them before they land. If you let six of them slip through your net you will be defeated.

Not all the Martians can be trapped in your force field. Destroyers can break through and will kill you if they make contact.

Imposters turn into destroyers at the last moment just as you are about the trap them.

Martians runs on a BBC model A or B and costs £5.95 plus VAT from Leeds-based Micropower.

Also new from Micropower this month are versions of the popular arcade games *Missile Command* and *Galaxians*. The games run on the BBC model B and are available at £6.95 plus VAT.

PIMANIA

A Fleet Street style bonanza of cash prize incentives is being offered by some up and coming games manufacturers.

Automata of Hampshire set the ball rolling with their *Pimania* game. The game owes a lot to the successful Kit Williams book *Masquerade*.

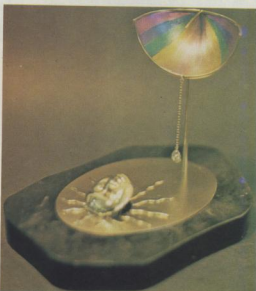
Unlike the jewelled hare of *Masquerade* the treasure is not buried secretly in the countryside but hidden metaphorically at a certain "time and place".

The prize for the lucky winner of *Pimania* is the Golden Sundial of Pi, an elaborate compass and sundial crafted in gold, diamonds, worth £6,000.

Not to be outdone Hull-based Artic Computing are offering £10,000 plus two tickets to the mystery city where the money is stashed away to the person who can solve their international finance adventure game — *Krakit*.

Is £10,000 the limit in prize money so far offered by the software houses? It seems so at the moment — but what's that rumour from Automata about a free trip around the world?

Pimania runs on a Sinclair



Spectrum in 48K and on a ZX81 with versions in the pipeline for the BBC 32K, and *Dragon* 32K. The Spectrum version costs £10 and the ZX81 £8. The *Dragon* and

BBC versions will be available for Christmas at £10.

Krakit also runs on a Spectrum and a ZX81 and is available at £9.95 for either version.

**"We will be flying at a height of 30,000 feet.
Our air speed will be 500 knots.
And there's a fair chance we're going to crash."**



No smoking. Fasten your seat belt. You're about to take off in a 747. But on this flight you're the pilot.

You could hardly describe THORN EMI's 'Jumbo Jet Pilot' as simply another video game. It's more like a session in a flight simulator with life-like instrumentation and graphics.



Jumbo Jet Pilot, 16 K ROM. Cartridge. 5 skill levels. Performance rating. Controls: Thrust, Altitude, Elevator, Undercarriage Brakes, Stall Indicator, Lights, Fuel, Longitude, Latitude, Air Speed, Artificial Horizon, Altitude, Pitch and Roll, Heading, Vertical Speed, Way Reference and Grid, Time Elapsed.

To cope you need to be alert. You should expect the unexpected. And you definitely shouldn't lower the undercarriage when your air speed is dropping and the horizon suddenly appears vertical!

On landing, your in-flight computer will assess your skills and give a 'performance rating'. If you manage to land that is.

'Jumbo Jet Pilot' is one of 21 challenging new home computer games from THORN EMI. It's pretty demanding. But our programs aren't all work and no play.

'River Rescue', 'Kickback' and 'Soccer' are all-action games. 'Pool' and 'Darts' will suit armchair sportsmen.

And whilst budding Beethovens play the 'VIC Music Composer', would-be Chancellors can work on their budgets with 'Home Financial Management'.



Darts



Rescue a Damselfish

We also have educational puzzles for children that will puzzle adults at higher skill levels. But there's one simple idea behind all our titles: we've designed them for players who are bored with run-of-the-mill TV games.

Now is that Heathrow ahead? Or is it Hyde Park?



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TV GAMES CENTRES TV GAMES CENTRES TV GAMES C VIDEO SCREEN

CHARMING ENCOUNTER WITH E.T.

E.T.

ET, the friendly Kermit the frog-like alien who is taking American cinemas by storm will soon be appearing in a brand new video game for the Atari VCS.

The game is still only in the production stage but is expected to be in the shops by Christmas together with a new upgraded baseball game.

The film opens in this country in November. It is Steven Spielberg's latest blockbuster. The 34 year-old director — already a millionaire with successes like Jaws, Close Encounters of the Third Kind, and Raiders of the Lost Ark under his belt — has hit on yet another winning formula.

E.T. is a friendly alien. He has no plans to colonise the universe, and has no lasers, death stars, or destroyer ships in tow. He befriends a little boy and is carried around in his new friend's cycle basket.

The idea of an odd, or friendly, or even helpless alien is not new. But this is the first time it has been given the full Hollywood treatment.

So what about the game? We will be publishing a full description and review as soon as the information is available from Atari — which should be in time for our next issue — watch out for it!

CAN YOU SOLVE THE DARK SECRET?

One of the darkest secrets of video gaming is the Riddle of the Sphinx.

This Atari VCS cartridge from the Imagi range is still to be solved by US gamers and should prove just as difficult for those in the UK.

This unique game which combines action with clue gathering is proving so difficult to beat we felt the first person to come up with an answer should be rewarded.

So in conjunction with Imagi's UK distributors, Hale's Limited, we are putting forward a



HOUNDED BY THE DOG CATCHER CAT TRAX

Cat Trax is the first new Pacman type game I have seen since Mattell's Lock 'n' Chase to offer any real development of the basic theme.

In this version you can actually change the shape of the maze as the game is in progress.

A series of gates which can be closed to turn the maze into a single long passage can be opened and shut to trap the dogs

that are chasing you around the maze.

You are a cat being pursued around a maze by three dogs. As you travel you eat up the dots which fill the maze until the maze has been cleared.

Every so often a fish will appear at the centre of the maze. If you eat this you will change into a dog collecting van which you drive around the maze in pursuit of the dogs which can now be deposited in the kennel at the top of the maze. But you will have to be quick as you change back into a cat 30 seconds after eating the fish.

The game also features a warp button which enables you to disappear if the dogs are about to catch you and then reappear in a different part of the maze.

It runs on the Hanimex HM5000.

RIDDLE OF THE SPHINX

prize for the first person to discover the secret of the Riddle of the Sphinx.

The winner will receive £185 worth of Imagi goods, courtesy of Hale's Limited. This includes the other six titles in the range planned for release over here: Demon Attack, the top-selling Tricshot, Atlantis, Star Voyager, Cosmic Arc and Fire Fighter. Plus a storage container for the Atari games centre and all its attendant wires which organises and 15 cartridges.

Reviewed in our November issue, Riddle of the Sphinx, sets you down in the Valley of Kings, among the pyramids, palm trees and temples of the desert, charged with the mission of collecting priceless treasures and artifacts.

If you solve the Riddle of the Sphinx, send a photograph of the screen to: Imagi Competition, Computer & Video Games, Durrant House, 8, Herbal Hill, London EC1R 5JB.

If you think you are getting

Escape is the name of the game in this second new offering from Hanimex this month.

You are trapped in an electronic maze with highly charged walls which, if you touch them, the walls will electrocute you.

The aliens are after you. You must shoot them out of the way before you make a dash for the exit of the maze. There is also a deadly spinning dicky-bow shaped flying saucer which will take off and home in on you at any moment. This cannot be shot by your figure. Arcade veterans will recognise this as a version of the popular video favourite — Beserk.

The games are in the shops now at £16.

THE GAME OF THE FILM . . .

The list of memorabilia on sale in the wake of successful new films is becoming quite daunting. As well as the book, the record, the t-shirt and the badge, video games players will soon be able to purchase the game of the film.

Mattell were the first company to spot this potentially lucrative games market with two games for their Intellivision machine based on the new Walt Disney film Tron.

Atari themselves are about to enter the field with game versions of Stephen Spielberg's latest blockbusters Raiders of the Lost Ark and ET.



close, then send us a letter to tell us of your discoveries so far. Good luck and may your camel's hoof never descend upon the scorpion's tail.

CENTRES TV GAMES CENTRES TV GAMES CENTRES VIDEOSCREEN

WORDS OF WISDOM FROM A B17!

Does the game sound good? This is soon to become as important a consideration as playability and what a game looks like.

Leading the field in talking games so far are Mattel with two games for their Intellivision machine.

B17 Bomber takes you on a bombing trip over Berlin, Dresden, and Hamburg.

It's 1943 — a critical period in World War II. Your mission is to destroy the German war machine by knocking out factories, refineries, warships, airstrips, and anti-aircraft batteries.

The targets are not sitting ducks. You must avoid the barrage of flak exploding around you

TALKING GAMES

— and what's that the pilot just shouted?

"Bandits at 12 o'clock". You are now the gunner. The survival of the plane depends on your ability to blast away with the machine gun around and take out those Messerschmitts that are screaming down towards the great hulking target of the B17.

At the start of the game you pick your targets on a map of Western Europe which appears on the screen. Extra points are awarded for successfully bombing a target further from base.

But this is no place for the adventurer. All missions have to

be carefully planned. You have to fly the plane, fire the guns, drop bombs, and do all the navigation with a constant eye on the altitude, fuel, speed, course, and the supply of bombs left.

The second talking game so far available from Mattel and featuring their voice synthesiser is Space Spartans.

You are at the cockpit of a Starfighter. Your computerised flight information controls talk to you as you prepare for battle.

The ship's computer reports on the status of all ship systems.

The Central Computer reports on the energy level and the number of aliens. An alert is sounded by the star base computer when

the aliens attack your starbases. The alien commander tells you when the battle is over.

Mattel are developing more talking games. It has to be said however, that the games are not cheap. Space Spartans, and B17 Bomber for example cost £29.95.

The games require the Intellivision sound synthesiser module. This plugs into the Intellivision centre's games socket. The module is in the shops now at £50.

STOP THE SUITCASE SHAMBLES

LOST LUGGAGE

Lost Luggage tumbles from the revolving baggage dispenser as you — the unfortunate porter, struggle to pick them up.

The bags start coming faster and faster as you move the porter right, left and up and down with the joystick.

Lost Luggage is basically a catching game based on the popular Intellivision game Kaboom where the player had to catch bombs.

In this game it's not explosions you get if you make a bad catch but a red face as the contents of the bags spill out on the floor of the airport terminal.

The more you catch the more you score. The game requires speed and manoeuvrability to score really highly. Lost Luggage is the latest addition to the Apollo range of games for the Atari VCS.

IN THE JUNGLE SOMETHING STIRS

Pitfall Harry is the Tarzan of video games.

He is also your companion in a perilous journey through the jungle in search of treasure.

Harry's adventures include swinging over streams on ropes, hopping across a crocodile-infested river using the crocs' heads as stepping stones, avoiding avalanches of logs and sudden swamps.

Among the other deadly fauna are snakes and scorpions which

PITFALL HARRY

lie in wait among the jungle foliage.

The screen shows a picture of the jungle with a dense covering of trees. At ground level is Harry, jumping logs and whatever other obstacles are in the game at any given time and below him an underground passage is connected to ground level by a ladder.

HERE'S OUR NEW TOP TEN...

A new feature of Computer & Video Games will be a top ten chart featuring the best selling TV games centre cartridges over the previous month.

The figures come from retail outlets rather than distributors and the ones printed below feature the best selling cartridges over the whole range of machines for the month of September.

Mattel's new launches during that month have all sold well and assured that machine filling three of the top five positions. Atari's Defender takes the top spot though.

We will be checking on the best selling cartridges every month from now on.

CARTRIDGE MANUFACTURER

1. Defender
2. Lock and Chase
3. Utopia
4. Night Stalker
5. Star Master
6. Pacman
7. Sub Hunt
8. B17 Bomber
9. Space Hunt
10. Trickshot

- Atari
Mattel
Mattel
Mattel
Activision
Atari
Mattel
Mattel
Mattel
Imagic

- MACHINE
Atari VCS
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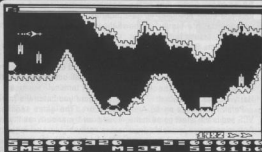
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Endgame is the part of chess where precision is most important — one slip here can throw away the benefits of hard-won advantages and victories secured in the middle game.

Computers generally play endgames badly and yet it is endgame play which is widely believed to be the best mark of a good human player.

A well known example of King and Pawn against King (KPK) is in figure 1. White's only winning move is K-QB2, not K-Q2 or K-K2. Yet to discover this by searching involves looking ahead 27 ply.

If KPK is so difficult, it is hardly likely that a program would find the best move in a complicated endgame such as, King, Rook and two Pawns against King, Rook and three Pawns. How can the grandmasters' endgame knowledge be captured? An obvious approach is to turn to textbooks such as *Basic Chess Endings* by Reuben Fine.

To a precise reader, textbooks turn out to be full of errors, ambiguities and obscurities. The rules given are invariably vaguely worded with numerous exceptions. Despite this there is the remarkable fact that textbooks are genuinely useful to the reader and in the case of endgames such as KPK seem to show how to play almost perfectly.

A possible explanation is that chess players have some "internal model" in terms of which a piece of advice such as, "develop Knights before Bishops" can be interpreted without its meaning being precisely specified.

For instance, "Knights before Bishops" is subordinate to "Do not lose your Queen for nothing" and this is considered too obvious to be worth stating.

Finding all such hidden exceptions to rules is difficult for the programmer but simple for the textbook reader to do. Often there is a conflict of objections. How does "advance the Pawn" rate relative to "take the opposition with your King"? People seem to resolve such conflicts without even noticing them.

The art of chess playing is often sacrificed on the altar of chess programming.

The usual way of writing chess programs is based on generating huge trees of variations and assigning each position a fairly crude numerical value. This is geared to what computers can do well rather than the special difficulties of the game itself.

Human players do not analyse tens of thousands of variations before making a move. As I showed last month, grandmasters do not analyse much more than ordinary mortals, but they are much better at recognising features of a position which suggest good moves.

Conventional chess programs have achieved surprising success in recent years, but to advance to grandmaster level may require building in expert knowledge as well as deep searching. Artificial intelligence (A.I.) researchers have devoted considerable effort in the last few years to identifying the form which expert knowledge might take. The restricted nature of endgames has made them a frequent vehicle for such research. Even elementary endgames such as King and Pawn against King are remarkably difficult to program in the usual way.

One of the most important skills which humans exhibit is the ability to generalise from specific examples to a large number of equivalent positions while also recognising exceptions.

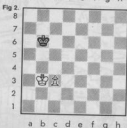
In figure 2, White's only winning move is K-N4. Giving this information to a human player immediately gives him a great deal of other information. For example, if the whole configuration of pieces were moved to the left or the right or up or down the board, the same White move (King one square forward) might well still be right (you might like to check whether this is really true).

And with the White King on N4 and the Pawn on B2 initially, the move P-B3 is also correct, since it transposes to the same winning position. K-N4 would still be the correct first move, even if White's King were on R3 or R4 instead of N3 in figure 2.

There are clearly many different situations represented by the one diagrammed example and the chess player can make this generalisation easily while appreciating that if the White King were on QB4 in Figure 2, K-N4 would ^{obviously} be the correct move. Playing K-Q5 then gives a position which is more favourable than taking the opposition.

Given an endgame programming environment, which allowed one example position to stand for many, where unspoken objectives (such as "avoid losing material") were automatically included and priorities among goals were easily specified, it might indeed be possible to program the endgame by giving little more than the examples from a textbook.

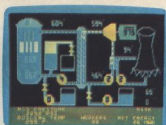
This sort of approach has been tried in different forms several times in the last few years. As an example of what benefits may be gained, it turns out that to program KPK for the stronger side to win in every winnable position requires only the specifying of 20 simple patterns, plus a suitable "environment", not the 38 ply search needed by a conventional approach.







Music Composer



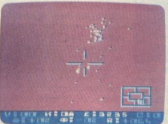
Scram



Graph-It



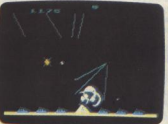
Intro to BASIC 1



Star Raiders



European Countries



Missile Command



Basketball

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Gorf presents the player with five mini-games. The combination offers variety, but also makes the game tough since each portion has its own strategy. The game also barks out an insult at the player when he loses a man.

The first mission you face is Astro Battle. Invaders are dropped into place; they then begin moving and shooting.

When the Astro Battle invaders are being dropped into place, they cannot move or shoot. Kill as many as possible since you don't have to worry about moving targets or enemy fire.

Pay little attention to the shield. It will let your shot through and block enemy shots. But if you depend on the shield, you may be unpleasantly surprised.

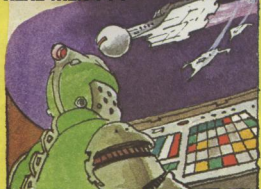
As in Eliminator, a shot in Gorf will disappear if another one is fired. If you see a shot is going to hit a target, avoid the urge to fire another. But if a shot is a clear miss, fire again right away.

In Laser Battle, you must deal with two laser cannons protected by escorts. The cannons fire beams that extend from their ship to the bottom edge of the screen, forcing the player to avoid two shots at a time.

The laser cannons are the main threat. You should try to wipe them out early in the round. Don't get trapped between two shots. Also, watch out for the last shot of a dying cannon. Even after the cannon is gone, this shot will be lethal.

Avoid being drawn into can-

TIPS ON GORF A GAME FOR REAL MEN ...



non fire by the escort dive bombers, and take advantage of your ability to move in all directions when dealing with the escorts.

To deal with the Galaxians, get as close as possible, shoot, then pull the stick back until the shot hits. Repeat this technique, using rapid jerks of the joystick. Don't allow your ship to become trapped. Stay in the mid screen area, so you have a buffer zone.

The Space Warp mission has a black hole at the centre of the screen. This releases objects that fly an outward spiralling orbit. Since you can move upward, it is a good idea to get as close to the black hole as possible in the early part of the wave.

When the Gorfian robot appears, fire as many shots as possible. If you don't kill it fairly quickly, back away from the centre of the screen and wait until the robot has gone off the edge of the screen.

In the Flagship mission, you must fire a shot into the core of a ship. Your shots eat away parts of the ship, and at times cause chunks to fall off.

The shield offers no real help. Just blast a hole in the centre and fire through it.

When debris falls from the ship, you can either dodge it or shoot it for extra points. In tight situations, don't worry about the points.

WATCH OUT, THE WARRIOR IS ABOUT!

DARK WARRIOR

The aliens have landed and they are attacking by land and air!

In this encounter, which reads like something out of Star Wars, the Imperial Federation has landed its assault force on your planetoid and charged it with the mission of destroying your remaining fuel deposits.

While its aerial forces keep you busy, the Dark Warrior approaches from beyond the horizon, keeping low to outwit your laser guns. With each aerial task force which is destroyed, the Warrior sends in a new one to attack your laser base.

After two of the aerial forces have been destroyed, the deadly Neutron blast force, which is unerringly guided to destroy your laser blaster.

When the fuel runs low there is a verbal warning: "Beware the Dark Warrior is coming."

Dark Warrior is one of a range of eight cassette games which form the Century Video System (one of which, Outline, was featured last month). The cassettes are similar to those used in home computers and can be plugged into existing games cabinets to change the game. Other computers are also adopting similar systems.

So if you recognise a game as being on the Century system and would like to try one of the challenges described on these pages, then implore your arcade/pub manager to try and get it for you. We will continue to look through the Century range each month.

The Gorf tips are taken from a chapter devoted to the game in a new US publication, *Guide to the Video Arcade Games*.

Twenty games are included with a description of the play and tips on how to achieve a good score. The tips are generally aimed at the beginner and more advanced players will have already progressed beyond the book's power to help.

The book is written by two young American gamers, David Lubar and Owen Linzmeier and is published by Creative Computing Press at a cost of £2.00.

IS IT A BIRD OR A PLANE?

Buy a hang-glider and see the world. That's the message in the high-flying arcade game, Fast Freddie.

Fast Freddie is a hang-glider with a yen for travel. His aim is to stay in the air as long as possible but he must use his skill to manipulate the invisible air currents, wind direction and the unpredictable up and down drafts.

Players use a joystick to control Fast Freddie as he soars over the wonders of the world. His flight takes in the Alps, both in winter and summer, the pyramids and sphinxes of Egypt, the Taj Mahal, the Pacific Ocean and a host of trees, bridges, tropical islands and other landscapes.

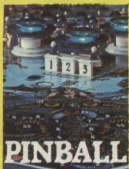
FAST FREDDIE

A series of obstacles can be found in the skies for Freddie to manoeuvre around. These include: aircraft, birds, helicopters and a magic flying carpet-complete with genie.

Ideally Freddie should fly above the obstacles and kick them out of the way.

Points are scored by swooping down close to earth and snatching flags which are posted along the ground. He can also grab special flags with letters on and spell out a "Bonus" for himself. Further points come for landing on five landing pads which can be found on the way.





PINBALL

It was a pinball player's paradise! The Pinball Owners' Association convention held recently in South London that is.

People flocked from all over the country to play and display their favourite tables.

Around 20 pins were on show and the convention also saw the battle for the coveted Pinball Wizard title.

Dave Dutton from Leeds claimed that honour after battling through to the final which was played on the latest Gottlieb machine, Rocky.

Among the machines on show were Magic City, a Williams machine from '67, Fireball, a Bally table reckoned by pinball addicts to be the classic machine made in '72, and a Williams Flash.

The Pinball Owners' Association was born in 1976 and has grown rapidly. It offers a spares service, a technical library, a monthly magazine and invaluable advice for all pinball owners and players. Membership costs £7.50, and this includes a subscription to the magazine, called *Pinball Player and Penny Slot Collector*, plus all the other services the association offers.

If you are interested in pinball — or any amusement machines — further information, or membership, is available from the association's HQ at the following address: The Pinball Owners' Association, Arcadia, 465 Cranbrook Road, Ilford, Essex, IG2 6EW.

FRANK, DRAC & PICO!

Only in films would a character called Little Pico dare take on the likes of Dracula, Frankenstein and the awesome Chameleon Man... only films and "X" rated arcade games.

Monster Bash is the name of this imaginative game of horrors which combines some of the aspects of Alien Panic, Donkey Kong and Pacman.

Little Pico is charged with the task of entering the castles of Frankenstein and Dracula and the graveyard of Chameleon Man and destroying each in turn.

The stairways of Dracula's house are guarded by bats but Pico has a "zap" power which he can use to shoot these creatures. Dracula is invulnerable to an ordinary zap and a charge of "super-zap" must be sought by Pico. He achieves this by lighting candles which energise a magic sword.

The candles also serve to make Dracula weak and when Pico touches the energised sword he earns a charge of superzap to try out on Dracula.

Frankenstein's castle is a similar type of challenge but with

MONSTER BASH

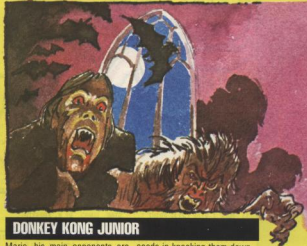
werevolves instead of bats.

The Chameleon Man has spiders as his pets and these are not affected by lit candles. He also has the power of changing colour to match his surroundings and Pico must make use of three colour buttons to keep this fiend visible.

The final power of Chameleon Man is his tongue which can reach out to ensnare Pico or soak-up superzap bolts.

A moon also features on the screen. It is Pico's timer, if it goes behind a cloud he knows his superzap power has dwindled and he will have to light more candles.

There are also such peculiarities as Warp Doors — which can only be used when they are lit — and Jump Down Zones for Monsters and Pico to use.



DONKEY KONG JUNIOR

Mario, his main opponents are the snapjaws which travel up and down the vines. Blue ones travel one way only (downwards) while red Snapjaws wander up and down. Junior can use fruit he finds on the vines to hurl at the pursuing Snapjaws and scores extra points when he suc-

ceeds in knocking them down.

At the very top of the screen is Junior's main aim, the key to his Dad's cage which hangs from a platform above said cage. But when he reaches it, Mario merely rushes Dad off to another cage, and another screen challenge.

MONKEYING AROUND WITH MARIO

It's a strange life in the arcades. One moment you're the hero and the next you're public enemy Number One.

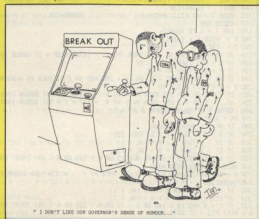
Take poor Mario, the intrepid carpenter who risked all to save the captive girl in Donkey Kong.

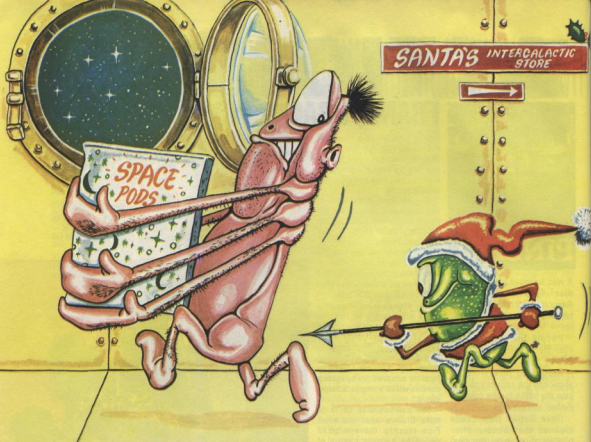
In the game's sequel, Donkey Kong Junior, Mario is cast as the evil villain. He has captured Donkey Kong and holds him under lock and key in a cage at the top of the screen.

The rescue bid must be undertaken by Donkey Kong Junior.

Like its predecessor, the Junior version has four screens of action. The first screen is the one featured in this piece and it consists of vines which hang from a series of platforms, suspended in the sky. Junior starts his bid from five stepping stones which rise above a river.

Apart from the whip-holding





5 HOME : COSUB 6000: COSUB 10000

10 HGR

15 HOME : VTAB (21): PRINT " STAR GUARD BY N. FORSYTH."

20 HCOLOR= 7: HPLDT 0:0 TO 0:159 TO 279:159 TO 279:0 TO 0:0

30 FOR Y = 0 TO 159 STEP 3

40 HPLDT INT (RND (1) * 280) * Y

50 NEXT Y

60 B0(1) = 135:BX(4) = 135:BX(7) = 135

62 B0(2) = 139:BX(5) = 139:BX(8) = 139

64 B0(3) = 143:BX(6) = 143:BX(9) = 143

70 B1(1) = 75:BX(2) = 75:BX(3) = 75

72 B1(4) = 79:BX(5) = 79:BX(6) = 79

135 XV = 101BV = 101VY = 7

140 CX = 139:CY = 79:ID = 1

145 AL = 1

181 IF S > 0 THEN 187

182 POKE - 16368:0: FLASH: PRINT "

184 WAIT - 16384:128

185 HOME : VTAB (21): PRINT "

107 COSUB 500

190 FOR T = 1 TO 100000

200 K = PEEK (- 16384)

205 Z = FRE (0)

210 IF (K = 160) * (AF = 0) THEN POKE - 16368:0:SF = 1: COSUB 700:SF = 0

220 IF K = 201 THEN VY = - VY

230 IF K = 205 THEN VY = VY

240 IF (K = 202 AND XV > 0) OR (K = 203 AND XV < 0) THEN XV = XV * - 1

250 X = X + XV:Y = Y + VY

255 IF X < 0 OR X > 279 THEN XV = XV * - 1: X = X + XV: COSUB 1000

256 IF Y < 0 OR Y > 159 THEN VY = VY * - 1: Y = Y + VY: COSUB 1000: POKE - 16368:0

260 XDRAW 0 AT 0X:0Y: XDRAW 0 AT X:Y

270 0X = X:0Y = Y

280 IF AF = 1 THEN RETURN

290 IF H / 2 = INT (H / 2) THEN 350

310 IF CY > B THEN B = B + (AL + 1)

320 IF CY < 0 THEN B = B - (AL + 1)

325 IF L = 0 AND (B > 145 OR B < 15 OR A > 245 OR A < 15) THEN FOR P = 1 TO 1015P = PEEK (- 1633

61: NEXT P: B = 2: GOTO 4000

330 A = A + AV: IF A > 279 OR A < 0 THEN AV = - AV: CB = 0: COSUB 1000: A = A + AV

340 GOTO 380

350 IF (CX > A) THEN A = A + (AL + 1)

360 IF (CX < A) THEN A = A - (AL + 1)

365 IF L = 0 AND (B > 145 OR B < 15 OR A > 245 OR A < 15) THEN FOR P = 1 TO 1015P = PEEK (- 1633

61: NEXT P: B = 2: GOTO 4000

74 B1(7) = 83:BX(8) = 83:BX(9) = 83

100 ROT = 0: SCALE = 1

110 FOR X = 1 TO 9

120 XDRAW 9 AT BX(X):BY(X)

130 NEXT

135 HPLDT 130:71 TO 147:71 TO 147:87 TO 130:87 TO 130:71

140 X = 139:Y = 40:0X = 139:0Y = 40

145 COSUB 5000

150 XDRAW 0 AT 0X:0Y

153 KEM !!! SET UP SCREEN !!!

154 L = 7:157 = 6000:15 = 0

HIT ANY KEY TO START

" : NORMAL

SCORE="15

RUNS ON AN APPLE

IN 24K

BY NEIL FORSYTH

You can tell it's almost Christmas. Even our favourite friends the aliens are getting into the festive spirit. It seems that the best selling gift this year is a space pod — and our little aliens just can't get enough of them. Some unscrupulous aliens have actually decided to resort to stealing these much sought after space pods. As an employee of Santa's Intergalactic Branch your job is to defend these pods from the marauding aliens.

This game comes in two parts. In the first you blast away at the multi-armed aliens as they attempt to steal the pods. If you manage to shoot an alien which has stolen a precious pod



before it reaches the edge of the screen you'll get the pod back. In part two — which starts after the third multi-armed alien is shot — your task is to collect pods being dropped by aliens. You must do this quickly as the aliens have the nasty habit of exploding — and will destroy you if your ship is too close. If you manage to get through unscathed the game starts again with your ship at reduced power until you reach 6000 points when you will be refueled.

Controls are: I-up, J-left, K-right, M-down.

Variables and subroutines

A X CO-ORDINATE of alien or alien pod
AF When spaceship movement routine is used as a subroutine "AF" confirms use of return
AL Current form of alien

```

370 B = B + AV: IF B > 159 OR B < 0 THEN AV = - AV: CB = 0: GOSUB 1000: B = B + AV
380 XDRAW AL AT OA:OB: XDRAW AL AT A+B
390 OA = A:OB = B
400 IF (A > CX - 10) * (A < CX + 10) * (B > CY - 10) * (B < CY + 10) * (CB < > 1) THEN GOTO 450
450 IF (A > OX - 8) * (A < OX + 8) * (B > OY - 3) * (B < OY + 4) THEN D = 4: FOR P = 1 TO 128 STEP
81: ROT = P:SP = PEEK ( - 16336):
XDRAW B AT OX:OY: NEXT P: ROT = 0: GOTO 4000
410 IF SF = 1 THEN RETURN
420 NEXT
450 XDRAW 9 AT BX(L)+BY(L)
460 L = L - 1: FOR P = 1 TO 10:SP = PEEK ( - 16336): NEXT P
470 CB = 1
480 IF SF = 1 THEN RETURN
490 NEXT
495 REM
496 REM *** MAIN ROUTINE ***
497 REM
500 H = INT ( RND (1) * 2 ) + 1
502 IF B = 4 THEN D = 1:AL = AL + 1
505 IF H / 2 = INT ( H / 2 ) THEN GOTO 560
507 RA = 5
510 B = INT ( RND (1) * 141 ) + 10
520 A = INT ( RND (1) * 2 ) + 1
530 IF A = 1 THEN A = 0:AV = AL * 1.8
540 IF A = 2 THEN A = 279:AV = - AL * 1.8
550 GOTO 600
560 A = INT ( RND (1) * 200 )
570 B = INT ( RND (1) * 2 ) + 1
575 RA = 9
580 IF B = 1 THEN B = 0:AV = AL + 1
590 IF B = 2 THEN B = 159:AV = - (AL + 1)
600 OA = A:OB = B
610 XDRAW AL AT OA:OB
620 RETURN
630 REM
640 REM *** PUT ALIEN ON SCREEN ***
650 REM & SELECT DIRECTION
660 REM VERTICAL OR HORIZONTAL
700 IF (X > 270 AND XV > 0) OR (X < 10 AND XV < 0) THEN RETURN
701 UX = X: XDRAW 10 AT UX:Y
705 IF XV < 0 THEN FOR XB = X - 10 TO 0 STEP - BV
710 IF XV > 0 THEN FOR XB = X + 10 TO 279 STEP BV
715 GOSUB 290
720 XDRAW 10 AT UX:Y: XDRAW 10 AT XB:Y
725 SP = PEEK ( - 16336 ) - PEEK ( - 16336 )
740 IF ((UX > 2 > A) AND (A < XB - 2)) OR ((UX - 2 < A) AND (A < XB + 2)) OR ((A < XB - 5) AND (A <
XB + 5)) AND ((Y > B - 5)
AND (Y < B + 5)) THEN GOTO 800
745 IF (UX > CX - 10) * (UX < CX + 10) * (OY > CY - 10) * (OY < CY + 10) THEN XDRAW 9 AT BX(L)+B
Y(L):L = L - 1: FOR P = 1 TO 10:
SP = PEEK ( - 16336 ): NEXT P: IF L = < 0 THEN D = 2: GOTO 4000
750 IF PEEK ( - 16384 ) > 128 THEN XDRAW 10 AT XB:Y: RETURN
760 UX = XB
780 NEXT XB
785 XDRAW 10 AT UX:Y
790 RETURN
794 REM
795 REM *** SPACESHIP FIRES ***
796 REM
800 XDRAW AL AT OA:OB: SCALE = 2
802 FOR B = 0 TO 128 STEP 8
805 ROT = R
810 XDRAW AL AT OA:OB
815 SP = PEEK ( - 16336 )
820 NEXT R
822 XDRAW AL AT OA:OB
825 SCALE = 1
830 S = 5 + (10 * AL): VTAB (21): HTAB (22): PRINT S
840 REM
850 XDRAW 10 AT XB:Y
860 D = D + 1
880 IF D = 1 THEN L = L + 1: XDRAW 9 AT BX(L)+BY(L):CB = 0: PRINT CHR$ (7)
890 IF D = 4 AND AL = 5 THEN POP: GOTO 900
900 GOSUB 500
895 RETURN
897 REM *** HIT ALIEN ROUTINE ***
900 AF = 1
905 FOR T = T TO (T + 4)
910 GOSUB 2000
915 T1 = 1: INT ( RND (1) * 5 ) + 3 * 10
917 PSKE = - 16368 + 0
920 FOR N = 1 TO T1
925 GOSUB 2000
930 IF (X > A - 8) * (X < A + 8) * (Y > B - 8) * (Y < B + 8) THEN S = S + 100: VTAB (21): HTAB (22)
: PRINT S: XDRAW 7 AT A+B: PRINT
CHR$ (7): GOTO 955
935 NEXT N
940 SC = XV * 2 * SGN (XV): SCALE = SC: FOR R = 0 TO 127 STEP 4
942 CP = PEEK ( - 16336 )
945 ROT = R: XDRAW 10 AT A+B
950 NEXT R
951 SCALE = 1: ROT = 0: XDRAW 7 AT A+B:SC = SC * 3
952 IF (X > A - 5C) * (X < A + 5C) * (Y > B - 5C) * (Y < B + 5C) THEN B = 1: FOR P = 1 TO 128 STEP
81: ROT = P:SP = PEEK ( - 16336 ):
XDRAW B AT OX:OY: NEXT P: ROT = 0: GOTO 4000
955 NEXT T
960 S = 5 + (L * 50): VTAB (21): HTAB (22): PRINT S

```


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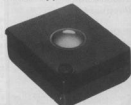
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AV.....Aliens velocity along its chosen direction towards the center
 B.....Y CO-ORDINATE of alien or alien pod
 BV.....Your ships bullet velocity
 CB.....Value is one if alien has got a pod
 CX.....X CO-ORDINATE of screen center
 CY.....Y CO-ORDINATE of screen center
 D.....Number of kind of alien appeared so far (3 of each kind)(also mode of death at end of same)
 H.....Randomly chosen direction for alien(horizontal or vertical)
 J.....Loops
 K.....Read Keyboard
 L.....Number of pods left
 M.....Looping
 N.....Looping
 OA.....Old X CO-ORDINATE of alien
 OB.....Old Y CO-ORDINATE of alien
 OX.....Old X CO-ORDINATE of spaceship
 OY.....Old Y CO-ORDINATE of spaceship
 P.....Looping
 R.....Rotational loop when alien dies
 RA.....Vertical range of bullet
 S.....Score
 SC.....Scale for spaceship power up and pod explosion
 SF.....When spaceship fires, alien continues to move. Its movement routine is used as a subroutine SF determines whether the computer meets "NEXT" or "RETURN"
 SP.....Speaker click
 ST.....Score at which bonus power is given to spaceship(8000)
 T.....Loop around main routine(s)
 TI.....Time in which alien pod must be picked up before it explodes
 UXB.....Old X CO-ORDINATE of bullet
 VY.....Magnitude of spaceships vertical velocity
 X.....X CO-ORDINATE of spaceship
 XB.....X CO-ORDINATE of bullet
 XV.....Velocity of spaceship (horizontal)
 Y.....Y CO-ORDINATE of spaceship
 YV.....Velocity of spaceship (vertical)
 Z.....Looping

```

965 XV = XV - SCN (XV)/VY * VY - SCN (VY) * (7 / 10); BV = BV - 11AF * 01SF = 0: IF XV = 0 THEN B =
31: GOTO 4000
966 IF S > ST THEN ST = ST + 6000: COSUB 5000: GOTO 155
970 GOTO 140
980 REM *****MAIN ROUTINE FOR ALIEN PODS*****
1000 FOR P = 1 TO 51SP = PEEK ( - 16336): NEXT I: RETURN
1010 IF 1 = 1 REM SPEAKER BUZZ !!!
1200 A = INT ( RND (1) * 280): IF ((A > 128) * (A < 150)) + ((A > 0X - 11) * (A < 0X - 11)) THEN G
2000 A = INT ( RND (1) * 140) + 20: IF (B > CY - 10) * (B < CY + 10) THEN GOTO 2010
2010 B = B - 131H = A
2030 HCOLDR= 2: DRAW 4 AT H*H
2035 FOR P = 1 TO 25: XDRAM 4 AT H*H:SP = PEEK ( - 16336): NEXT P
2040 HCOLDR= 7: DRAW 4 AT H*H
2070 FOR P = 1 TO 400: NEXT P: XDRAM 4 AT H*H: XDRAM 6 AT H*H
2072 FOR P = 1 TO 500: NEXT P
2075 FOR J = 1 TO 2
2080 FOR Z = 0 TO 10 TO B
2090 XDRAM 7 AT A+Z
2100 SP = PEEK ( - 16336)
2110 NEXT Z
2120 NEXT J
2130 XDRAM 7 AT A+B
2135 HCOLDR= 2: DRAW 6 AT H*H
2140 FOR P = 1 TO 25: XDRAM 6 AT H*H
2145 SP = PEEK ( - 16336)
2150 NEXT P
2160 HCOLDR= 0: DRAW 6 AT H*H
2170 HCOLDR= 7: HPLDT 0+0 TO 0+159 TO 279+159 TO 279+0 TO 0+0
2180 HPLDT 130+71 TO 147+71 TO 147+87 TO 130+87 TO 130+71
2190 RETURN
2200 REM
2210 REM *****HYPERSPACE ALIEN*****
2220 REM ON SCREEN DEPOSIT
2230 REM ALIEN POD THEN
2240 REM LEAVE
2250 REM
4000 TEXT : HOME
4010 FLASH
4020 IF D = 1 THEN PRINT "THE BOBBY TRAP GOT YOU."
4030 IF D = 2 THEN PRINT "ALL THE PODS ARE GONE."
4040 IF D = 3 THEN PRINT "YOUR POWER CELLS ARE DEAD."
4045 IF D = 4 THEN PRINT "THE ALIEN WASHED YOU."
4050 NORMAL
4460 PRINT
4470 PRINT "SCORE: " S
4480 PRINT
4490 FOR P = 1 TO 500: NEXT P: POKE - 16368+0
4190 PRINT "DO YOU WANT TO PLAY AGAIN?": GET A$
4110 IF A$ = "Y" THEN CLEAR I: GOTO 10
4120 TEXT : HOME : END
4130 REM
4440 REM *** END OF GAME ROUTINE ***
4150 REM
5800 FOR N = 1 TO 2
5810 FOR SC = 12 TO 1 STEP - 1
5815 SCALE= SC
5820 XDRAM 8 AT X,Y
5825 POKE 768+SC * N * 10: POKE 769+10: CALL 770
5830 REM *** PLAY MUSIC NOTES ***
5840 NEXT SC
5850 NEXT N
5860 RETURN
5870 REM
5880 REM *****POWER UP SPACESHIP *****
5890 REM
6000 FOR X = 770 TO 792
6010 READ Y
6020 POKE X,Y
6030 NEXT X
6040 DATA 173,48,192,136,208,5,206,1,3,240,9,202,208,245,174,0,3,76,2,3,96,0
6050 RETURN
6060 REM
6070 REM *****POKE IN MUSIC ROUTINE *****
6080 REM
10008 HGR2 : TEXT : POKE 232,16: POKE 233,64
10010 SCALE= 1: ROT= 0
10020 FOR X = 16400 TO 16575
10030 READ Y
10040 POKE X,Y
10050 NEXT X
10060 DATA 10+0,22+0,35+0,52+0,64+0,84+0,109+0,131+0,141+0,164+0,170+0
10070 DATA 62+63,44+33,36+53,42+45,62+51,54+39+0
10080 DATA 39+39,39+9,10+9,53+59,54+45,58+31,27+39,41+40
10090 DATA 42+44,37+60,50+63,60+55,46+53,21+0
10100 DATA 62,27,39,37,45+44,46+44,42+46,62+62,54,35,60+63,55,41+46+0
10110 DATA 13,60+63,63,39,13+44,13,53,13+62,22,53,23,59+12,60+63,39,23,55+13+44,5+0
10120 DATA 62,27,39,37,45+44,46+44,42+46,62+62,30,30,36+63,63,63,14+53,5+0
10130 DATA 63,12,37,21+46,30+63,14+5+0
10140 DATA 54+45+46+44,37+45+60,39,63+60,62,63,39,55+63,62+50,45+46+53,37+45+0
10150 DATA 62,36,45,54,7+0
10160 DATA 63,12,17,41,13+0
10170 RETURN
10180 REM
10190 REM *****POKE SHAPE TABLE *****
10200 REM ONTO HGR2 SCREEN
10210 REM TO SAVE MEMORY
10220 REM

```


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ALIEN CHASE

BY JANEK SIRRS

RUNS ON A BBC MODEL B IN 32K

ZZZZZZZZipppppppp!

There goes another run-
away alien! Can you stop
them reaching the enemy
bases and telling them all
your secrets? You have to
chase the swift aliens
through an asteroid belt.
You must catch them be-
fore they reach the bot-

tom of the screen —
otherwise they escape
and your secrets will be
common knowledge
among the little green
meanies. Unfortunately
the only way you can stop
them is by firing a laser
terminal. As the game pro-

gresses the alien run-
aways get quicker and
the number of asteroids
increases — making
things just a bit more diffi-
cult.

The cursor keys control
left and right movement
while the Space fires the
deadly laser.

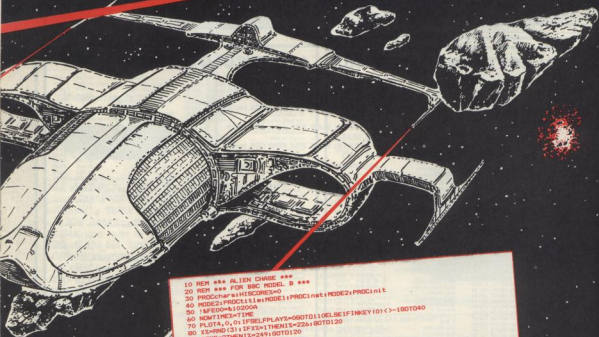


Illustration: Dorian Cross

```

10 REM *** ALIEN CHASE ***
20 REM *** FOR BBC MODEL B ***
30 PROCchar=HISCORE=0
40 MODE2:PROC111:MODE1:PROC1net:MODE2:PROC1net
50 IFMODE=1:GOTO20
60 NONTIME=TIME
70 PLOT4,0,0:IFBPLAY=0GOTO10ELSEIFINKEY(0)<1:BOTD40
80 X=RND(3):Y=RND(3):IFX=1:THENX=22:Y=BOTD120
90 IFY=2:THENY=249:BOTD120
100 IX=153:BOTD120
110 IX=7215
120 IFX=22:PROC1net
130 IFX=153:THENX=1:BOTD160
140 IFX=249:THENX=1:BOTD160
150 IX=0
160 COLC=7:PRINTAB(SX,SX) " " IFX=1X<0ORX=1X<19:THENX=0
170 IFPOINT(64+IX,1X)=32,(31-IX)=32:16)>BOTD280
180 SX=IX+1:PRINTAB(SX,SX) CHRS224:CHRS30
190 TX=RND(3):IFX=1:THENX=1ELSEIFX=2:THENX=0ELSEX=1
200 IFTIME=NONTIME+TETHENNONTIME=TIME:JX=1:TX=1:IFAY=30:COLC=12:PRINTA
B(AX,AY) CHRS225:COLC=12:PRINTAB(1,12) "THE ALIEN ESCAPES!" :FORL3=1:GOTO280
210 IFAX=1X<0ORAX=1X<19:THENX=0
220 COLC=2:PRINTAB(AX,AY) " " :AX=AX+1:AY=AY+1:JX=0:PRINTAB(AX,AY) C
HRS225:CHRS30
230 IFPOINT(64+SX,32),(31-SX)=1)>32:16)>BOTD280
240 PRINTAB(SX,SX) " " :TAB(AX,AY) " " :X=RND(4):IFX=4 OR RND(1):PRINTAB(0
31) " " :BOTD280
250 COLC=3:PRINTAB(RND(17)-1,32-1X) :OBSTACLES(X)
260 COLC=7:PRINTAB(SX,SX) CHRS224:COLC=2:PRINTAB(AX,AY) CHRS225:R=R+0.001
IFR>1:THENR=0.9
270 BOTD70
280 RX=1X+1:Y=6Y:PROCexplosion:COLC=PRINTAB(15,12) "GAME OVER!" :FORL3=1:GOTO
2000:NETX3
290 IFBPLAY=1:BOTD40:ENDPROC:V0U19,0,4,0,0,0:COLC=1
300 COLC=1:PRINTAB(10,1) "A L I E N C H A S E" :PRINTAB(10,2) " - - - - - "

```

```

510 COLOUR3:PRINT*** Bad Luck Commander --- I'm afraid that*** you've let the
alien escape this time!
520 PRINT*** Your final score was - "1:COLOUR2:PRINTSCOREX
530 IF SCOREX>=HIGHSCORE THEN HIGHSCORE=SCOREX
540 COLOUR3:PRINT*** Today's high score is - "1:COLOUR2:PRINTHIGHSCOREX
550 COLOUR1:PRINT*** ANOTHER GAME (Y/N) ?
560 AS=GET$:IF AS="Y" GOTO40ELSE IF AS<>"N" GOTO360
570 MODE7:END
380 DEFPROCfire
390 SOUND,1,5,1:FOR LX=SYX+1 TO YX-1:IF PLOT(SX+64+32,(31-LX)*32+16)=4 THEN SOUND
B1,1,100,1:SCOREX=SCOREX+100
400 COLOUR1:PRINTTAB(SX,LX)CHR$(236):NEXT LX:FOR LX=SYX+1 TO YX-1:PRINTTAB(SX,LX)
NEXT LX
410 IF SX<>AXX GOTO430 ELSE SCOREX=SCOREX+10:EXX=ATX:YX=AYX:AXX=AND(17+1):AYX=20
NEXT LX
420 COLOUR1:PRINTTAB(0,0)STRING$(20," ")TAB(3,0)"SCORE:"1:SCOREX:COLO
UR128:FOR LX=1 TO 5000:NEXT LX
430 ENDPROC
440 DEFPROCexplosion
450 PRINTTAB(EXX,EYX) "1:FOR LX=1 TO 50:GCOL,3:PL0T69,64:EXX=16+(RAND(64)*$ON(RND
11),(31-EXX)*32+16+(RAND(32)*$ON(RND11))$BOUND,-LX/3,4,1:NEXT LX
460 PRINTTAB(EXX-1,EYX-1) "CHR$(10)STRING$(3,CHR$(8))
NEXT LX
470 ENDPROC
480 DEFPROCchase
490 VDUX23,224,0,0,0,56,84,254,84,0,23,225,60,126,90,126,126,102,60,23,226,
102,153,153,126,126,153,153,102
500 VDUX23,227,0,192,248,248,232,254,254,254,23,226,0,147,255,255,255,255,2
55,23,229,0,29,63,127,127,127,63,127
510 VDUX23,230,254,252,254,252,252,248,248,128,23,231,255,255,255,255,193,1
29,0,23,232,127,127,255,127,127,15,7,0
520 VDUX23,233,255,255,255,255,255,255,255,23,234,254,254,252,254,254,254,2
54,254,23,235,127,63,63,127,127,63,127
530 VDUX23,236,16,16,16,16,16,16,16,16
540 D1:OBSTACLES(1)=CHR$(226)+OBSTACLES(2)+CHR$(229)+CHR$(227)+CHR$(10)+C
HR$(8)+CHR$(8)+CHR$(232)+CHR$(230)
550 OBSTACLES(15)=CHR$(229)+CHR$(228)+CHR$(10)+STRING$(3,CHR$(8))+CHR$(235)+CHR$(2
33)+CHR$(234)+CHR$(10)+STRING$(3,CHR$(8))+CHR$(232)+CHR$(231)+CHR$(230)
560 ENDPROC
570 DEFPROCinit
580 SCOREX=0:HIGH SCORE=0:SYX=6:AXX=AND(17)+1:AYX=20:R=,1:TX=250
590 ENVELOPE1,0,0,0,0,0,0,0,0,0,0,254,100,128:ENVELOPE2,2,50,100,-60,11,100,12
0,50,106,-100,10,100,80
600 ENDPROC
610 DEFPROCtitle
620 GCOL,1:PL0T4,0,512:PL0T4,0,1023:PL0T85,640,512:PL0T85,640,1023:GCOL,2:PL
0T85,1279,1023
630 PL0T4,640,512:PL0T85,1279,512:GCOL,3:PL0T85,1279,0:PL0T4,640,512:PL0T85,6
40,0:GCOL,0,4:PL0T85,0,0:PL0T4,640,512:PL0T85,0,511
440 GCOL:PRINTTAB(15,14)"A L I E N"TAB(15,17)"C H A S E"
450 FOR LX=1 TO 100:VDU19,RND(4),RND(4),0,0,0:BOUND1,-LX/7,RND(255),1:BOUND2,-LX/
7,RND(255),1:NEXT LX
660 FOR LX=1 TO 2000:NEXT LX
670 ENDPROC
680 DEFPROCinit
690 CLS:VDU19,0,4,0,0,0:COLOUR1:PRINTTAB(5,12)"DO YOU NEED INSTRUCTIONS (Y/N)
?"
700 AS=INKEY$(1000):IF AS="Y" THEN SELFPLAY=1:ENDPROC
ELSE COLOUR1:PRINTTAB(10,1)"A L I E N C H
A S E"TAB(10,2)"- - - - -"
720 COLOUR3:PRINT*** Try to shoot the fleeing alien before*** it reaches the
bottom of the screen*** amongst asteroids and enemy starbases"
730 PRINT*** Use cursor keys to move left or right*** and press 'SPACE' to fi
re your laser."
740 COLOUR1:PRINT***TAB(15)"PRESS ANY KEY TO CONTINUE:"AS=GET$
750 CLS:PRINTTAB(7,1)"S T A R S H I P D A T A":PRINTTAB(17,2)"- - - - -"
760 CLS:PRINTTAB(15)"CHR$(225)TAB(15)"1:COLOUR1:PRINT-- Alien starbase (North)"T
aints"
770 COLOUR2:PRINT*** "CHR$(226)TAB(15)"1:COLOUR1:PRINT-- Asteroid (Nor
th)"100 points"
780 COLOUR2:PRINT*** "OBSTACLES(12)TAB(20)"1:COLOUR1:PRINT-- Asteroid (Nor
th)"100 points"
790 COLOUR2:PRINT*** "PRESS ANY KEY TO BEGIN THE GAME:"AS=GET$
800 ENDPROC

```

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Cosmic Swarm

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and COLOUR GENIE
programs

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Once you have decided on the number of players — up to four can take part — each player is given three throws of the dice. A player may decide to stick with the first or second throw by simply pressing Newline. Otherwise he will select individual dice to be thrown by typing A, B, C, D, or E in any order and in any combination. After the third throw — or when a player has decided to stick — the player must select an option from 1-12. The appropriate score is then given and the next player takes his turn. The game ends when all the players have taken all their 12 options. The one with the highest score is the winner. Will it be you? Roll those dice and find out!

RUNS ON A ZX81 IN 16K

BY C. J. BARHAM



YACHT II

```

10 LET T$="ABCDE"
20 DIM (15)
70 LET P1=1
72 LET LE=10
80 LET P2=5
90 LET P3=12
100 LET PLUS=50
110 LET Z$="1 ONES---2 TWOS--
-3 THREES-4 FOURS-5 FIVES-6
SIXES--55 TOTAL*#BONUS**7
CHOICE-8 FULL/MS9 4/KIND-10 LT
L/ST-11 BIG/ST-12 YACHT---**TOTA
L**"
800 CLS
802 PRINT AT 10,10;"YACHTZEE"
810 PRINT AT 12,1;"HOW MANY PLA
YERS ? (1-4)"
820 INPUT PLRYS
830 IF PLRYS<1 OR PLRYS>4 THEN
GOTO 800
832 RAND
840 CLS
900 FAST
902 LET NUMG=0
910 LET PL=1
920 DIM P (PLRYS,15)
930 FOR N=1 TO PLRYS
940 FOR M=1 TO 14
942 IF M=7 OR M=8 THEN GOTO 960
950 LET P(N,M)=-1
950 NEXT M
970 NEXT N
980 GOSUB 9000
990 SLOW
1000 LET TURN=0
1002 PRINT AT 18,1;"PLAYER ";PL
1005 LET A$="ABCDE"
1008 GOTO 1022
1010 PRINT AT 20,0;"CHOOSE"
1012 INPUT A$
1014 PRINT AT 20,0;" "
1020 IF A$="" THEN GOTO 2000
1022 PRINT AT 18,10;"THROW ";TUR
N+1
1030 GOSUB 9000
1040 LET TURN=TURN+1
1050 IF TURN<3 THEN GOTO 1010
9000 GOSUB 9200
9610 PRINT AT 20,0;"OPTION ?"

```

```

2012 PRINT AT 21,0;"(1-12)"
2020 INPUT OP
2030 PRINT AT 20,0;" "
2032 PRINT AT 21,0;" "
2040 IF OP<1 OR OP>12 THEN GOTO
2050
2052 IF OP>5 THEN LET OP=OP+2
2055 IF P(PL,OP)>0 THEN GOTO 20
2070 LET PTS=0
2080 LET FLAG=0
2090 IF OP=6 THEN GOTO 2200
2100 GOSUB 9000
2110 LET P (PL,7)=P (PL,7)+PTS
2112 PRINT AT 7,(PL-1)*P2+P1+P3;
P (PL,7)
2120 IF P (PL,7) < PLUS THEN GOTO 3
000
2122 IF P (PL,8)>0 THEN GOTO 3000
2130 LET P (PL,8)=50
2140 PRINT AT 8,(PL-1)*P2+P1+P3-
1;"*50*"
2150 LET P (PL,15)=P (PL,15)+50
2160 IF OP<>9 THEN GOTO 2300
2210 FOR N=1 TO 5
2220 LET PTS=PTS+H(N)
2230 NEXT N
2240 GOTO 3000
2300 GOSUB 9200
2305 IF OP=10 THEN GOSUB 9500
2310 IF OP=11 THEN GOSUB 9400
2320 IF OP=12 THEN GOSUB 9600
2330 IF OP=13 THEN GOSUB 9700
2340 IF OP=14 THEN GOSUB 9300
3000 LET P (PL,OP)=PTS
3010 PRINT AT OP,(PL-1)*P2+P3+P1
PTS
3012 LET P (PL,15)=P (PL,15)+PTS
3014 PRINT AT 15,(PL-1)*P2+P1+P3;
P (PL,15)
3020 LET PL=PL+1
3030 IF PL<(PLRYS+1) THEN GOTO 1
000
3040 LET PL=1
3050 LET NUMG=NUMG+1
3060 IF NUMG<12 THEN GOTO 1000
3080 GOSUB 7000
3090 PRINT AT 18,8;WIN;" WINS

```




```

3100 IF INKEY$(<)" THEN GOTO 800
3110 FOR N=1 TO 10
3120 NEXT N
3130 PRINT AT 18,8;" "
3140 FOR N=1 TO 5
3150 NEXT N
3160 GOTO 3090
7000 REM S/R TO DETERINE WINNER
7010 LET MAX=P(1,15)
7020 LET MIN=1
7030 IF PLR5=1 THEN RETURN
7040 FOR N=2 TO PLR5
7050 IF P(N,15)(<MAX THEN GOTO 7
080
7060 LET MAX=P(N,15)
7070 LET MIN=N
7080 NEXT N
7100 RETURN
8000 REM S/R TO PRINT CATS
8010 FOR N=1 TO 15
8020 LET PS=(N-1)*LE+1
8030 LET PF=PS+LE-1
8040 PRINT AT N,1;Z$(PS TO PF)
8050 NEXT N
8060 FOR N=1 TO 5
8070 PRINT AT 20,(N-1)*3+10;T$(N
)
9050 NEXT N
9060 FOR N=1 TO PLR5
9100 PRINT AT 0,(N-1)*P2+P3;"*P
:N;"*
9110 NEXT N
9120 RETURN
9000 REM S/R TO THROW REOD DICE
9010 LET N1=LEN A$
9020 FOR N=1 TO N1
9030 FOR M=1 TO 5
9040 IF A$(N)<T$(M) THEN GOTO 9
080
9050 LET H(N)=INT (RND*6)+1
9060 NEXT M
9070 NEXT N
9080 FOR N=1 TO 5
9090 PRINT AT 21,(N-1)*3+10;H(N)
9100 NEXT N
9110 RETURN
9200 REM S/R TO COUNT SPOTS
9210 DIM C(6)

```

```

9230 FOR N=1 TO 5
9240 LET C(H(N))=C(H(N))+1
9250 NEXT N
9260 RETURN
9300 REM S/R TO CALC YACHT
9310 FOR N=1 TO 6
9320 IF C(N)=5 THEN LET PTS=50
9330 NEXT N
9340 RETURN
9400 REM S/R TO CALC 4/KIND
9410 FOR N=1 TO 6
9420 IF C(N)=4 THEN LET FLAG=1
9440 NEXT N
9450 IF FLAG<>1 THEN RETURN
9460 FOR N=1 TO 5
9470 LET PTS=PTS+H(N)
9480 NEXT N
9490 RETURN
9500 REM S/R TO CALC FL/HSE
9510 GOSUB 9800
9520 IF CT<>4 THEN RETURN
9530 FOR N=1 TO 5
9540 LET PTS=PTS+H(N)
9550 NEXT N
9560 RETURN
9600 REM S/R TO CALC LTL/ST
9610 GOSUB 9800
9640 IF C(6)=0 AND CT=1 THEN LET
PTS=30
9650 RETURN
9700 REM S/R TO CALC BIG/ST
9710 GOSUB 9800
9720 IF C(1)=0 AND CT=1 THEN LET
PTS=30
9730 RETURN
9800 REM S/R TO CALC CT
9810 LET CT=0
9820 FOR N=1 TO 6
9830 IF C(N)=0 THEN LET CT=CT+1
9840 NEXT N
9850 RETURN
9900 REM S/R TO CALC 123456
9910 FOR N=1 TO 5
9920 IF OP=H(N) THEN LET PTS=PTS
+OP
9930 NEXT N
9940 RETURN

```



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Actual screen photo

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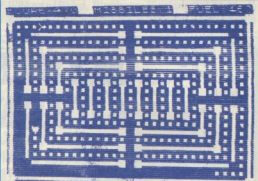
RUNS ON A SPECTRUM IN 16K

BY DAVID HOUNSLOW

Painting white lines down the middle of the road has never been an easy task. All those motorcycles, cars and juggernauts racing around are hardly an ideal environment for the creative white line painter. But now things are getting even worse. I suppose it had to happen in the era of the microchip. Someone carrying out one of those time and motion studies has come up with the idea that white line painters would work quicker if missiles were chasing them. A fair point I hear you say. Anyone would work quicker if a highly explosive missile was coming their way...

This is a mixture of two arcade games. You have to guide a white line painter along a road — eating dots and painting lines at the same time. You must also remember to avoid the heat seeking missile which chases you.

Keys 5, 6, 7, 8, control your movement. Pressing 1 will double your speed — pressing it a second time will return you to normal speed. However this uses more fuel and should only be used in emergencies. When you manage to clear a screen another will appear with two missiles — one of them travelling at double speed. There are a couple more features of the game which must remain a mystery — but *Computer and Video Games* readers like mysteries — don't you!



```

1 DIM S$(2): DIM O(2): DIM F$
(2): DIM X(2): DIM Y(2): DIM S(2)
2 LET H$="0": LET G$="0": LET
dots=0: LET score=0: LET y=20:
-LET x=25: LET B$="S"
3 LET O(1)=55: LET O(2)=55: L
ET X(1)=23: LET Y(1)=2: LET X(2)
=25: LET Y(2)=4: LET S(1)=1: LET
S(2)=2
4 LET B=0
10 LET FUEL=500: RESTORE: PAP
ER 7: BORDER 7: BRIGHT 0: INK 1:
INVERSE 1: OVER 0: FLASH 0: CLS
20 FOR I=0 TO 7: POKE USR "a"+
I, 50: NEXT I
30 FOR I=0 TO 7: POKE USR "b"+
I, 0: IF I=1 AND F46 THEN POKE US
R "b", 255
40 NEXT I
50 FOR I=145 TO 154
60 FOR I=0 TO 7
70 READ A: POKE USR CHR$(I)+I
80 NEXT I
90 NEXT I
100 DATA BIN 00011000, BIN 00011

```

```

200,BIN 01111110,BIN 01111110,25
5,255,255,BIN 11000011
110 DATA BIN 11000011,255,255,2
55,BIN 01111110,BIN 01111110,BIN
00011000,BIN 00011000
120 DATA BIN 1110000,BIN 1111
100,BIN 01111100,BIN 01111111,BI
N 01111111,BIN 01111110,BIN 1111
1100,BIN 11110000
130 DATA BIN 00001111,BIN 0011
111,BIN 00111110,BIN 11111110,BI
N 111110,BIN 00111110,BIN 0011
1111,BIN 00001111
140 DATA BIN 00011000,BIN 0011
100,BIN 01111110,BIN 00011000,BI
N 00011000,BIN 00111100,BIN 1110
0111,BIN 11000011
150 DATA BIN 11000011,BIN 1100
111,BIN 00111100,BIN 00011000,BI
N 00011000,BIN 01111110,BIN 0011
1100,BIN 00011000
160 DATA BIN 11,BIN 00100011,BI
N 01100110,BIN 1111100,BIN 1111
110,BIN 01100110,BIN 00100011,B
IN 11
170 DATA BIN 11000000,BIN 11000
100,BIN 01100110,BIN 00111111,BI
N 00111111,BIN 01100110,BIN 1100
0100,BIN 11000000
180 DATA 0,0,50,50,50,50,0,0
190 REM
191 REM
192 REM
193 PRINT 10; " SPACEROLLER B
Y 0.HOURS";
200 PRINT AT 0,11; "MISSILES:";
+1; FOR I=1 TO 21: PRINT AT I,0;
";AT I,30;": NEXT I
205 PRINT AT I,5;
";AT 21,0;":
210 FOR I=2 TO 20: PRINT AT I,1
; INK 0;:
220 PRINT AT 3,2;
";AT 19,2;":
230 FOR I=4 TO 9: PRINT AT I,2;
";AT I,28;":;AT I+9,2;":;AT
I+9,28;": NEXT I
240 PRINT AT 10,2;";AT 11,1;
INK 4;"; INK 1;AT 12,2;";
250 PRINT AT 10,8;";AT 11,27
INK 4;"; INK 1;AT 12,28;";
260 PRINT AT 3,14;"; INK 4;";
INK 1;";AT 19,14;"; INK 4;";
INK 1;";
270 PRINT INK 4;AT 2,15;";AT
4,15;";AT 18,15;";AT 20,15;";
280 PRINT AT 5,4;";
INK 4;"; INK 1;"; INK 4;";
AT 17,4;"; INK 4;";
290 FOR I=6 TO 10: PRINT AT I,4
;";AT I,26;";AT I+6,4;";;AT
I+6,26;": NEXT I
300 PRINT AT 10,4;";AT 12,4;";
;AT 10,26;";AT 12,26;";;AT
11,25;"; INK 4;AT 11,4;";;AT
11,25;";
320 PRINT AT 7,6;"; INK 1;"; I
NK 4;"; INK 1;";AT 1
5,6;"; INK 4;"; INK
1;";
330 FOR I=8 TO 9: PRINT AT I,6;
";AT I,24;";;AT I+5,6;";;AT
I+5,24;": NEXT I
340 PRINT AT 10,6;";AT 10,24;";
;AT 12,6;";AT 12,24;";;AT
350 PRINT INK 4;AT 11,6;";;AT
11,23;";;AT 6,15;";;AT 8,15;";
;AT 14,15;";;AT 16,15;";
360 FOR I=8 TO 22 STEP 2: PRINT
AT 9,I;";AT 13,I;": NEXT I
370 FOR I=10 TO 12: FOR I=8 TO
22 STEP 2: PRINT AT I,J;": NEX
T J; NEXT I
374 REM
375 REM
376 REM
380 INK 4
400 LET B=B+1: LET S=1: IF B=3
THEN LET B=2: LET S(2)=2
425 FOR C=1 TO S

```

```

435 LET O$=B$
436 IF INKEY$="1" THEN LET H$=9
; LET G$="": LET G$="1" AND H$=
"0";+ "0"; AND H$="1"; LET S=2;
(H$="1";+(H$="0"))
437 IF S=2 THEN LET FUEL=FUEL-1
; IF FUEL=0 THEN LET G$="0"; LE
T S=1
438 LET FUEL=FUEL-1: PRINT INK
2;AT 0,23;FUEL;";FUEL+(FUEL=0);
; IF FUEL=0 THEN PRINT AT 0,25;";
0
440 IF INKEY$<" " AND INKEY$>" "
1" THEN LET B$=INKEY$
441 LET OLDY=Y: LET
445 PRINT AT Y,X;";8" AND (ATTR (
Y,X+1)=56 OR ATTR (Y,X+1)=50))-
;S="5" AND (ATTR (Y,X-1)=56 OR A
TTR (Y,X-1)=60))
446 LET Y=Y+1;S="6" AND (ATTR (
Y+1,X)=56 OR ATTR (Y+1,X)=50))-
;S="7" AND (ATTR (Y-1,X)=56 OR A
TTR (Y-1,X)=60))
500 IF ATTR (Y,X)=56 THEN BEEP
.001,40: LET SCORE=SCORE+10: LET
FUEL=FUEL+1: PRINT AT 0,0; INK
2;SCORE;";SCORE;": LET DOTS=DOTS+
1: IF DOTS=50 THEN LET S(1)=2:
; IF DOTS=200 THEN LET DOTS=0: L
ET S(1)=1: GO TO 10
504 IF (X=X(1) AND Y=Y(1)) OR (
X=X(2) AND Y=Y(2) AND B=2) THEN
GO TO 700
505 IF OLDY=Y AND OLDX=X THEN L
ET B$=O$
510 IF B$="5" OR B$="6" OR B$=
"7" OR B$="8" THEN LET D$="": LET
D$="(1;" AND B$="6");+ "4;" AND B$
="7");+ "3;" AND B$="8");+ "1;" AND
B$="5";
515 PRINT AT Y,X; INK 2;D$
516 NEXT O
520 FOR P=1 TO B
530 FOR Q=1 TO S(P)
555 LE P$="": IF AND(.7 THEN G
O TO 570
540 LET P$="(3" AND X(X(P)) AND
(ATTR (Y(P),X(P)-1)=56 OR ATTR (
Y(P),X(P)-1)=50 OR ATTR (Y(P),X
(P)-1)=56)+ "5" AND X(X(P)) AND
(ATTR (Y(P),X(P)+1)=56 OR ATTR (Y
(P),X(P)+1)=50 OR ATTR (Y(P),X(P)
+1)=50))
560 IF P$<" " THEN GO TO 580
570 LET P$="(7" AND Y(Y(P)) AND
(ATTR (Y(P),X(P)-1)=56 OR ATTR (
Y(P)-1,X(P))=56 OR ATTR (Y(P)-1,
X(P))=60))+ "6" AND Y(Y(P)) AND
(ATTR (Y(P)+1,X(P))=56 OR ATTR (Y
(P)+1,X(P))=56 OR ATTR (Y(P)+1,X
(P))=50))
575 IF P$=" " THEN LET P$=S(P);
GO TO 577
580 PRINT AT Y(P),X(P);": IF
Y(P)=56 THEN PRINT AT Y(P),X(P);
; INK 0;";
590 LET X(P)=X(P)-(P$="8" AND (
ATTR (Y(P),X(P)-1)=56 OR ATTR (Y
(P),X(P)-1)=50 OR ATTR (Y(P),X(P)
-1)=56))+ (P$="5" AND (ATTR (Y(P)
,X(P)+1)=56 OR ATTR (Y(P),X(P)+1)
=50) OR ATTR (Y(P),X(P)+1)=56))
; IF (P$="7" OR P$="8") THEN LET Y
(P)=Y(P)-(P$="7" AND (ATTR (Y(P)
-1,X(P))=56 OR ATTR (Y(P)-1,X(P))
=56) OR ATTR (Y(P)-1,X(P))=60))+
(P$="6" AND (ATTR (Y(P)+1,X(P))=
56 OR ATTR (Y(P)+1,X(P))=50) OR A
TTR (Y(P)+1,X(P))=50))
600 LET O(P)=ATTR (Y(P),X(P))
610 IF P$<" " THEN LET F$P$="";
LET F$P$="(1" AND P$="7");+ "1;"
AND P$="6");+ "4;" AND P$="8");+
"3;" AND P$="5";
620 PRINT AT Y(P),X(P);F$(P)
625 LET S$(P)=P$
626 IF Y(P)=Y AND X(P)=X THEN G
O TO 700
630 NEXT Q: NEXT P
640 GO TO 425
700 INK 2: BRIGHT 1: FLASH 1: P
APER 7: CLS: BEEP 1,-40: FLASH
3: BRIGHT 0: CLS: PRINT AT 10,1
0;SCORE;";score: FOR X=1 TO 100
; NEXT X: RUN

```




"You youngsters don't know how well off you are! It's not easy being an old-age-pensioner you know. Take my trip to the post office to get my pension for instance. I have to cross an extremely busy road — dodging the big lorries and cars because they haven't put in a crossing yet. It's lucky I'm still quick on my pins otherwise I wouldn't be talking to you now. I've had several close shaves I can tell you! But that's not the end of it. After the road comes the river and as I never learnt to swim as a girl I had to devise a special way of getting across. It took me weeks and weeks and several loaves of Mother's Pride to get the ducks to help me out. Now they let me use them as stepping stones to get to the other side. I bounce off their backs like water off a . . . well you know the rest of that old saying don't you! The only trouble is that sometimes one of my feathered friends decides to take a quick dip just as I am about to step aboard. So far I've managed to avoid a ducking! Just my little joke. But I'm sure one day I'll end up in the drink. Anyway this nice young gentleman has just offered to take me across the road so I'll see you again soon — as long as the ducks are still friendly by the time I reach the river. Byebee!"

As you may have guessed by now this game is a version of that arcade favourite Frogger. In this version the frog is replaced by a granny and the frog's nests by several post offices. You are given four minutes to get seven grannies to a post office so you have to move fairly quickly. When the seventh granny reaches her destination she gets a double pension and you get another chance to help seven more old ladies across the road. The game starts slowly but speeds up. When a score of 2000 points has been reached the game is at its maximum speed — and will prove difficult to even the most avid Frogger player.

Variables.

AS(1-8), BS(1-16), CS(1-8): car, log and duck strings. AS: General get statement variable. H: Number of grannies and post offices. TIS: Time. Y: Distance down the screen. X: Distance right of the screen. A: Peeked number of character that granny is standing on. I: General movement loop. P: Peeked number of key being pressed. HT: Number of times granny has been hit. L: Delay loop. SC: Score.



```

1 DIMB(16),A$(8),C$(8)
10 PRINT"GRANNY" REM BY ANDREW MORTON.
20 PRINT"YOU ARE A GRANNY WHO HAS TO GO TO THE"
25 PRINT"POST OFFICE BUT YOU MUST FIRST CROSS THE"
30 PRINT"ROAD OUTSIDE YOUR HOUSE."
35 PRINT"WHEN YOU HAVE DONE THIS YOU FIND THAT"
40 PRINT"THE BRIDGE IS OUT.THERE'S ONLY ONE THING"
45 PRINT"THAT YOU CAN DO: JUMP ONTO THE"
50 PRINT"DUCKS AND LOOK FLOATING DOWN THE RIVER."
55 PRINT"THEN ALL THAT IS LEFT TO DO IS TO JUMP"
60 PRINT"INTO THE POST OFFICE."
65 PRINT"AS YOU CAN'T SWIM OR JUMP THE CARS"
70 PRINT"IF YOU MOVE OFF THE SIDE OF THE SCREEN"
75 PRINT"YOU WILL LOSE ONE OF YOUR THREE LIVES."
80 PRINT"LOOKS"
85 PRINT"LOOKS"
90 PRINT"ROAD"
95 PRINT"RIVER BANK"
97 PRINT"RIVER"
99 REM LOOK AND CARS VARIABLES

```

GRANNY

BY ANDREW MORTON

RUNS ON A 40 col PET IN 12K

```

100 A$(1)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
110 A$(1)=A$(1)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
120 A$(1)=A$(1)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
130 A$(1)=A$(1)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
140 A$(2)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
150 A$(2)=A$(2)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
160 A$(2)=A$(2)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
170 A$(2)=A$(2)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
180 A$(3)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
190 A$(3)=A$(3)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
200 A$(3)=A$(3)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
210 A$(3)=A$(3)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
220 A$(4)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
230 A$(4)=A$(4)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
240 A$(4)=A$(4)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
250 A$(4)=A$(4)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
260 A$(5)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
270 A$(5)=A$(5)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
280 A$(5)=A$(5)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
290 A$(5)=A$(5)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
300 A$(6)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
310 A$(6)=A$(6)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
320 A$(6)=A$(6)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
330 A$(6)=A$(6)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
340 A$(7)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
350 A$(7)=A$(7)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
360 A$(7)=A$(7)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
370 A$(7)=A$(7)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
380 A$(8)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
390 A$(8)=A$(8)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
400 A$(8)=A$(8)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
410 A$(8)=A$(8)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
420 B$(1)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
430 B$(1)=B$(1)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
440 B$(2)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
450 B$(2)=B$(2)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
460 B$(3)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
470 B$(3)=B$(3)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
480 B$(4)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
490 B$(4)=B$(4)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
500 B$(5)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
510 B$(5)=B$(5)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
520 B$(6)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
530 B$(6)=B$(6)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
540 B$(7)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
550 B$(7)=B$(7)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
560 B$(8)="XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
570 B$(8)=B$(8)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
580 FOR I=1 TO 8: B$(I)=B$(I)+B$(I): NEXT I
590 C$(1)=B$(1)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
600 C$(1)=C$(1)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
610 C$(2)=B$(2)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
620 C$(2)=C$(2)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
630 C$(3)=B$(3)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
640 C$(3)=C$(3)+"XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"

```



Illustration: Terry Hughes

sinclair
ZX Spectrum

JOYSTIX !



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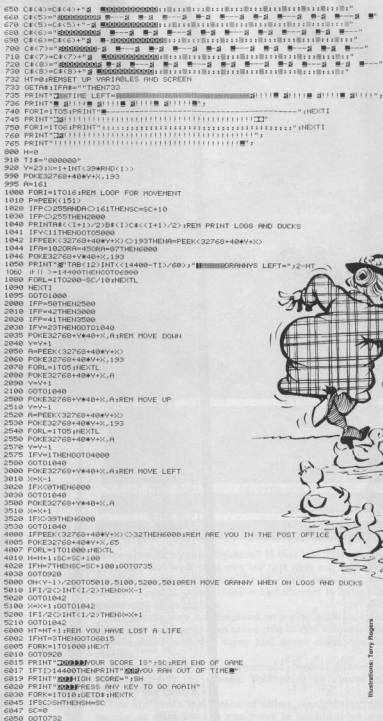
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Quantity	Item	Item Price	Total
	Joystick board (Spectrum)	£18.95	
	Space Bugs Vic 20	£4.00	
	Frog Vic 20	£4.00	
	Bomber Vic 20	£3.00	
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	Star Snake Spectrum	£1.99	
	Wordhanger Atari	£5.00	
	Postage & packing	£0.50	
	C & V.O. Dec 92		
	TOTAL:	£	£0.50
Send order to:- Interceptor Micro's, Lindon House, The Green, Tadley, Hants.			



HUNGARIAN

HEX

RUNS ON A TI99/4A IN 6K

BY STEPHEN SHAW

Remember Hungarian Squares? If that had you tearing your hair out wait until you try this new one from the devious mind of Stephen Shaw. This one does not involve squares — just rings — and it's sure to have you going around in circles.

The puzzle may be imagined as a disc with an outer ring of six colours and an inner ring of two colours. It is double sided and the outer and inner rings can be rotated.

There is also another — vertical — axis of rotation at right angles to the screen. This gives an almost 3D effect to the puzzle.

You are given the option of either manipulating the puzzle, or allowing the computer to jumble it up and attempting to restore it. Four skill levels make this brain twister a lasting challenge — will you take it up? Remember, the Cube has got nothing on this! Happy puzzling...

COMPUTER & VIDEO GAMES 83

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Read this ad

You: "Darling, I've decided to buy a computer."

Her: "***++**?!@XX??££**?!? off!"

You: "Yes, I know we could do with a new washing machine. But the new Dragon 32 Computer is much more important. It's the first computer actually designed for all the family - and it costs under £200!"

Her: "***++?!@££?! fortune!"

You: "No, I'm not being selfish. Computers are for the whole family - and they're going to play a big part in the children's future."

Her: "Oh?"

From this point on, the conversation should follow more reasonable lines.

Allowing you to fully explain the many advantages of the new Dragon 32 family computer.

32K RAM FOR UNDER £200*

For a start, the Dragon offers 32K RAM. Your wife may not understand that, so just tell her that the Dragon's capabilities are truly massive - at least twice as powerful as its competitors, with some features you won't find even in more expensive units. The Dragon will give you all the power you're likely to need, and more, to create your own programs - along with

an exciting range of software which can do anything from helping with kids' spelling and arithmetic to creating your own cartoons.

THE FIRST FAMILY COMPUTER.

All of which brings you nicely to the point where you tell your wife just how much fun the kids will have with the Dragon. How it will save her all that

*Television not included in price.



money on those Space Invader machines. How it will magically translate simple typed instructions into beautiful drawings and designs using set, line, circle, draw, scale, rotate and paint features, in up to 9 colours - and play and compose

to your wife.

SPECIFICATIONS

6809E MICROPROCESSOR. Pet, Apple, Atari 400, BBC Micro, and VIC 20 still have the less powerful 6502.

32K RAM (as standard). At least twice the power of similarly priced machines. Expandable to 64K RAM.

EXTENDED MICROSOFT COLOUR BASIC (as standard). Featuring: ADVANCED GRAPHICS (set, line, circle, paint, print, draw, rotate and print using).

ADVANCED SOUND 5 octaves, 255 tones.

AUTOMATIC CASSETTE RECORDER CONTROL. FULL EDITING with INSERT and DELETE.

9 COLOUR, 5 RESOLUTION DISPLAY.

USE WITH ANY U.H.F TV and/or separate P.A.L. monitor.

PROFESSIONAL QUALITY KEYBOARD.

Typewriter feel. Guaranteed for 20 million depressions.

PRINTER (Centronics parallel).

JOYSTICK CONTROL PORTS.

with 5 octaves of music. How it will engross your children in mind-boggling adventures in dungeons and caves without even getting their knees dirty. And the Dragon works with any U.H.F TV

THEY'LL LEARN AS THEY PLAY.

And then you can casually point out that although the kids are having fun, they're also learning. And within a very short space of time, the whole family will be completely at home with programming - with computer language - with every aspect of how computers work. Which can't do their future prospects any harm at all.

BRILLIANTLY SIMPLE INSTRUCTION MANUAL.

The Dragon is made in Britain, designed with the help of British Universities. And it's also worth remembering

that the Dragon's instruction manual is clearer and easier to understand than any other home computers.

That its top-quality keyboard is as easy to use as a typewriter, and so well made it's guaranteed for twenty million depressions.

TAKE THE FAMILY DOWN THE HIGH STREET.

And if she still wants to know more, take her to see the Dragon 32. It'll soon be available in most good stores - or you can send the coupon for further details.

And if you're one of our many lady readers, please accept our apologies.

Perhaps you'd like to read this ad to your husband.

DRAGON 32 The first family computer.

To: Jean Webster, Dragon Data Ltd., Queensway, Swansea Industrial Estate, Swansea, Glamorgan SA5 4EH.
Tel: 0792 580651.

Please send me further information about the Dragon 32.

Name

Address

CV

A member of the Mettoy Group of Companies.



AIRLOCK

RUNS ON AN ATARI 400/800 IN 24K WITH JOYSTICK

BY STEPHEN LINGER

It's just another routine day in the life of the men working away in the heart of an advanced nuclear reactor when suddenly the unthinkable happens. A radiation alert. Sirens blare out a warning and emergency procedures go into action.

The maintenance men have to leave their underground workplace as rapidly as possible. The failsafe mechanism is beginning to shut down the reactor and seal off areas with airtight doors. Will you be able to get them out before time runs out?

Doors are opening and closing all over the building. Touching the walls will prove fatal — they are contaminated by the radiation leak.

One touch and you are finished.

You must keep moving always take the exit pre-

sented to you. Try not to get trapped.

Before starting the game ensure the joystick is plugged into port one on the front of your Atari. Apart from the initial Run instruction the whole game is controlled from the joystick.

```
5 REM AIRLOCK
7 REM BY S.F.LINGER
8 REM SPRINGFIELD CHELMSFORD ESSEX
10 GOSUB 3000
20 X=185:Y=115:C=0
25 HITCLR=53278
30 A=PEEK(106)-24:POKE 54279,A:PMBASE=25
63A
40 GOSUB 1000:REM BUILD FIRST MAZE
50 POKE 559,46:POKE 623,4:POKE 53277,3:P
OKE 53248,X
60 FOR J=PMBASE+512 TO PMBASE+640:POKE J
,0:NEXT J
70 POKE 704,124
80 FOR J=PMBASE+512+Y TO PMBASE+516+Y:RE
AD A:POKE J,A:NEXT J
90 DATA 10,28,40,8,20
100 RESTORE (90)
102 GOSUB 105:SETCOLOR 2,3,8:GOTO 117
```

```
105 FOR H=1 TO INT(RND(1)*1000)+500:NEXT
H
110 FOR Z=1 TO 3:FOR Z1=150 TO 20 STEP -
7:SOUND 0,21,10,7:SOUND 1,21+7,10,7:SOUN
D 2,21+14,10,7
112 FOR W=1 TO 20:NEXT W
115 SETCOLOR 2,3,INT(RND(1)*8)+2:NEXT Z1
:NEXT Z
116 FOR M=0 TO 2:SOUND M,0,0,0:NEXT M:SE
TCOLOR 2,15,3:RETURN
117 E=0
118 POKE HITCLR,0
120 A=STICK(0)
121 E=E+1:IF E>40 THEN GOTO 1700
125 POKE 87,1:POSITION 2,4:IF #6,"radiati
on leak"
127 POSITION 2,5:IF #6,"clear building"
130 IF A=15 THEN GOTO 120
135 C=C+1:IF C=350 THEN GOTO 1500
```



```

137 IF C=13 THEN COLOR 2:POKE 87,7:PLOT
134,70:DRAWTO 134,80
140 IF A=11 OR A=10 OR A=9 THEN X=X-2:PO
KE 53248,X
150 IF A=7 OR A=6 OR A=5 THEN X=X+2:POKE
53248,X
160 IF A=13 OR A=9 OR A=5 THEN FOR J=10
TO 0 STEP -1:POKE PMBASE+512+Y+J,PEEK(PM
BASE+510+Y+J):NEXT J:Y=Y+2
170 IF A=14 OR A=10 OR A=6 THEN FOR J=0
TO 10:POKE PMBASE+510+Y+J,PEEK(PMBASE+51
2+Y+J):NEXT J:Y=Y+2
175 L=PEEK(53252):IF L<0 THEN GOTO 2000
180 SOUND 0,140,10,4:FOR H=1 TO 10:NEXT
H:SOUND 0,0,0,0
185 D=2:6=INT(24/RND(1)+3):IF 6=4 THEN D=
4
200 POKE 87,7:60SUB INT(RND(1)*17)*10+50
00
300 ON X=205 GOTO 4000
900 GOTO 117
1000 GRAPHICS 23:SETCOLOR 4,15,3:SETCOLO
R 0,11,6:SETCOLOR 2,15,3
1005 START=PEEK(560)+PEEK(561)*256+4
1010 POKE START-1,66:POKE START+2,2
1015 POKE START+149,65:POKE START+150,PE
EK(560):POKE START+151,PEEK(561)
1017 POKE START+3,6:POKE START+4,6
1020 COLOR 1:PLOT 0,62:DRAWTO 4,62:DRAWT
O 4,10:DRAWTO 14,10
1025 DRAWTO 144,40:DRAWTO 154,40:DRAWTO
154,60
1030 COLOR 1:PLOT 0,62:DRAWTO 0,30:DRAWT
O 134,30
1035 PLOT 159,70:DRAWTO 159,33:DRAWTO 13
4,93:DRAWTO 134,90
1040 COLOR 2:PLOT 34,40:DRAWTO 34,20:DR
AWTO 14,20
1045 POKE 765,1
1050 POSITION 14,40:X10 18,6,0,0,"S:"
1060 PLOT 80,80:DRAWTO 80,82
1065 PLOT 134,73:DRAWTO 134,89
1070 PLOT 34,40:DRAWTO 54,40:PLOT 44,30:
DRAWTO 64,30:DRAWTO 64,60:PLOT 54,30:DR
AWTO 54,20
1080 PLOT 34,60:DRAWTO 54,60:DRAWTO 54,5
0:PLOT 44,40:DRAWTO 44,50
1090 PLOT 44,10:DRAWTO 44,20:PLOT 64,10:
DRAWTO 64,20
1100 PLOT 34,80:DRAWTO 104,80
1110 PLOT 44,70:DRAWTO 94,70:PLOT 74,70:
DRAWTO 74,50:DRAWTO 84,50
1120 DRAWTO 84,30:PLOT 74,40:DRAWTO 74,2
0:DRAWTO 84,20:PLOT 84,60:DRAWTO 94,60
1130 PLOT 94,10:DRAWTO 94,30:PLOT 84,40:
DRAWTO 104,40:PLOT 104,20:DRAWTO 104,30:
PLOT 104,60:DRAWTO 104,70
1140 PLOT 114,40:DRAWTO 114,60:PLOT 104,
70:DRAWTO 158,70:PLOT 140,60:DRAWTO 158,
60
1150 PLOT 124,60:DRAWTO 124,40:DRAWTO 13
4,40:DRAWTO 134,20:PLOT 124,20:DRAWTO 12
4,30:PLOT 134,70
1155 DRAWTO 134,50:DRAWTO 146,50
1160 PLOT 34,60:DRAWTO 34,50:DRAWTO 14,5
0
1170 POSITION 14,80:POKE 765,1:X10 18,6,
0,0,"S:"
1180 PLOT 114,40:DRAWTO 114,30:DRAWTO 10
4,30
1190 POSITION 104,40:POKE 765,1:X10 18,6,
0,0,"S:"
1195 PLOT 60,30:DRAWTO 60,36

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1200 PLOT 104,60:DRAWTO 104,50:DRAWTO 94
,50
1210 POSITION 94,60:POKE 765,1:X10 18,6,
0,0,"S:"
1215 PLOT 0,70:DRAWTO 7,70:PLOT 14,80:DR
AWTO 7,80
1220 PLOT 124,20:DRAWTO 124,10:DRAWTO 11
4,10
1230 POSITION 114,20:POKE 765,1:X10 18,6,
0,0,"S:"
1240 PLOT 14,80:DRAWTO 34,80:PLOT 14,40:
DRAWTO 34,40:PLOT 114,20:DRAWTO 124,20
1245 PLOT 104,40:DRAWTO 114,40:PLOT 34,6
0:DRAWTO 104,60
1250 PLOT 126,70:DRAWTO 126,60:PLOT 116,
80:DRAWTO 116,90
1300 RETURN
1500 GRAPHICS 17:SETCOLOR 4,15,15
1520 POKE 53248,5:POKE 53249,5
1530 POSITION 2,4:POKE 765,1:"TOO LATE-----"
1535 FOR U=1 TO 3:SOUND 0,40,10,12:SOUND
1,150,10,12:SOUND 2,75,10,12:FOR H=1 TO
200:NEXT H
1538 FOR S=0 TO 3:SOUND 3,0,0,0:NEXT S
1537 FOR H=1 TO 50:NEXT H:NEXT U
1540 FOR H=1 TO 200:NEXT H
1550 POSITION 2,6:POKE 765,1:"YOU'RE OUT"
1560 POSITION 2,8:POKE 765,1:"OF TIME!"
1562 FOR H=1 TO 500:NEXT H
1565 POSITION 2,10:POKE 765,1:"PRESS TRIGGER"
1570 POSITION 2,12:POKE 765,1:"TO RESTART"
1580 IF STRIG(0)=1 THEN 1580
1590 GOTO 20
1700 SOUND 0,140,10,12:SOUND 1,50,2,12:F
OR H=1 TO 150:NEXT H:SOUND 0,0,0,0:SOUND
1,0,0,0
1710 GRAPHICS 17:SETCOLOR 4,8,12
1720 POKE 53248,5
1725 POKE 53249,5
1730 POSITION 2,4:POKE 765,1:"YOU CAN'T STOP!"
1740 FOR H=1 TO 500:NEXT H
1750 POSITION 2,6:POKE 765,1:"KEEP MOVING!!"
1755 FOR H=1 TO 300:NEXT H
1760 POSITION 2,8:POKE 765,1:"try again"
1770 FOR H=1 TO 500:NEXT H
1780 POSITION 2,12:POKE 765,1:"PRESS TRIGGER"
1785 POSITION 3,10:POKE 765,1:"TO RESTART"
1790 IF STRIG(0)=1 THEN 1790
1799 GOTO 20
2000 POKE 53248,5:POKE 53249,5
2005 SOUND 1,12,130,10:FOR H=1 TO 100:NEXT
H:SOUND 1,0,0,0
2010 GRAPHICS 17:SETCOLOR 4,10,12
2020 POSITION 2,4:POKE 765,1:"THE RADIATION"
2025 POSITION 2,6:POKE 765,1:"IN THE HALLS"
2030 POSITION 2,8:POKE 765,1:"GOT YOU!!!"
2035 FOR H=1 TO 500:NEXT H
2040 POSITION 2,10:POKE 765,1:"PRESS TRIGGER"
2050 POSITION 2,12:POKE 765,1:"TO RESTART"
2090 IF STRIG(0)=1 THEN 2090
2100 GOTO 20
3000 REM DISPLAY LIST & TITLE
3020 GRAPHICS 2+16:SETCOLOR 4,0,12
3150 FOR H=1 TO 400:NEXT H
3160 COLOR 2
3200 POSITION 6,5:POKE 765,1:"airlock"
3250 SOUND 0,200,10,15:SOUND 1,255,10,18
3260 SOUND 2,00,10,15:SOUND 3,150,10,15
3270 FOR H=1 TO 20:NEXT H

```



```

3290 FOR H=0 TO 3: SOUND H,0,0,0:NEXT H
3295 FOR H=1 TO 500:NEXT H
3300 POSITION 2,9: ? #6:"PRESS TRIGGER TO
3305 POSITION 7,11: ? #6:"START"
3310 IF STRIG(0)=1 THEN 3310
3300 RETURN
4000 C=0:X=50:Y=95:HITCLR=53278
4001 POKE 53248,5
4002 A=PEEK(106)-24:POKE 54279,A:PMBASE=
256+A
4015 GRAPHICS 7+16:SETCOLOR 4,6,11:SETCO
LOR 0,4,4:SETCOLOR 2,7,8
4020 START=PEEK(560)+PEEK(561)*256+4
4025 POKE START-1,66:POKE START+2,2
4030 POKE START+149,65:POKE START+150,PE
EK(560):POKE START+151,PEEK(561)
4050 GOSUB 7000
4060 POKE 559,46:POKE 53277,3:POKE 53249
,X
4070 FOR J=PMBASE+640 TO PMBASE+748:POKE
J,0:NEXT J
4080 POKE 705,54:FOR J=PMBASE+640+Y TO P
MBASE+644+Y:READ A:POKE J,A:NEXT J
4090 DATA 10,28,40,8,20
4100 RESTORE (4090)
4102 E=0:POKE 623,4
4103 POKE HITCLR,0
4105 A=STICK(0)
4110 E=E+1:IF E>70 THEN 1700
4150 IF A=15 THEN 4105
4155 C=C+1:IF C>250 THEN 1500
4160 IF A=9 OR A=10 OR A=11 THEN X=X-2:P
OKE 53249,X
4170 IF A=5 OR A=6 OR A=7 THEN X=X+2:POK
E 53249,X
4180 IF A=5 OR A=13 OR A=9 THEN FOR J=10
TO 0 STEP -1:POKE PMBASE+640+Y+J,PEEK(P
MBASE+638+Y+J):NEXT J:Y=Y+2
4190 IF A=6 OR A=14 OR A=10 THEN FOR J=0
TO 10:POKE PMBASE+638+Y+J,PEEK(PMBASE+6
40+Y+J):NEXT J:Y=Y-2
4200 L=PEEK(53253):IF L<>0 THEN 2000
4220 SOUND 0,140,10,4:FOR H=1 TO 5:NEXT
H:SOUND 0,0,0,0
4300 D=3:G=INT(24RNDX1)+3:IF G=4 THEN D
=4
4320 GOSUB INT(RNDX1)*26)*10+8000
4350 IF Y<30 THEN GOTO 7500
4500 GOTO 4102
5000 COLOR D:PLOT 14,41:DRAHTO 14,49:RET
URN
5010 COLOR D:PLOT 34,41:DRAHTO 34,49:RET
URN
5020 COLOR D:PLOT 54,41:DRAHTO 54,49:RET
URN
5030 COLOR D:PLOT 55,60:DRAHTO 63,60:RET
URN

```

```

5040 COLOR D:PLOT 65,40:DRAHTO 73,40:RET
URN
5050 COLOR D:PLOT 74,41:DRAHTO 74,49:RET
URN
5060 COLOR D:PLOT 35,30:DRAHTO 43,30:RET
URN
5070 COLOR D:PLOT 44,21:DRAHTO 44,29:RET
URN
5080 COLOR D:PLOT 64,21:DRAHTO 64,29:RET
URN
5090 COLOR D:PLOT 84,51:DRAHTO 84,53:RET
URN
5100 COLOR D:PLOT 115,40:DRAHTO 123,40:R
ETURN
5110 COLOR D:PLOT 124,31:DRAHTO 124,39:R
ETURN
5120 COLOR D:PLOT 134,41:DRAHTO 134,49:R
ETURN
5130 COLOR D:PLOT 135,40:DRAHTO 143,40:R
ETURN
5140 COLOR D:PLOT 124,61:DRAHTO 124,63:R
ETURN
5150 COLOR D:PLOT 85,20:DRAHTO 93,20:RET
URN
5160 COLOR D:PLOT 105,20:DRAHTO 113,20:R
ETURN
7000 REM MAZE 2
7005 COLOR 1
7010 PLOT 0,70:DRAHTO 4,70:DRAHTO 4,60:D
RAHTO 4,20
7020 DRAHTO 40,20:DRAHTO 40,10:DRAHTO 14
0,10:DRAHTO 140,50:DRAHTO 152,50
7025 PLOT 20,50:DRAHTO 20,86:DRAHTO 60,8
6
7030 PLOT 0,80:DRAHTO 14,80:DRAHTO 14,50
:PLOT 60,86:DRAHTO 60,88:DRAHTO 84,88:DR
AHTO 100,76:DRAHTO 110,76
7035 PLOT 82,86:DRAHTO 82,68:PLOT 130,64
:DRAHTO 130,86
7040 PLOT 120,56:DRAHTO 120,66:DRAHTO 15
4,86:DRAHTO 154,76:DRAHTO 150,70
7050 DRAHTO 150,60:DRAHTO 153,60:DRAHTO
159,40:DRAHTO 150,40:DRAHTO 150,10:DRAHT
O 159,10
7055 COLOR 3
7060 PLOT 120,86:DRAHTO 120,76:DRAHTO 11
0,76
7065 POKE 765,2
7070 POSITION 110,86:XIO 18,#6,0,0,"S:"
7080 PLOT 20,50:DRAHTO 20,30:DRAHTO 14,3
0
7085 POKE 765,2
7090 POSITION 14,50:XIO 18,#6,0,0,"S:"
7100 PLOT 20,30:DRAHTO 30,30:PLOT 20,50:
DRAHTO 30,50:PLOT 30,40:DRAHTO 40,40:DR
AHTO 40,50
7105 PLOT 140,58:DRAHTO 140,60:DRAHTO 14
2,60:PLOT 140,34:DRAHTO 144,34
7110 PLOT 30,60:DRAHTO 60,60:DRAHTO 60,5

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0: DRAHTO 80,50:PLOT 70,60:DRAHTO 80,60
7115 PLOT 46,76:DRAHTO 46,78:PLOT 138,46
:DRAHTO 138,48:PLOT 140,76:DRAHTO 144,76
7120 PLOT 50,20:DRAHTO 50,50:PLOT 40,30:
DRAHTO 50,30
7125 PLOT 148,70:DRAHTO 150,70:PLOT 150,
40:DRAHTO 150,42
7130 PLOT 80,40:DRAHTO 62,30:DRAHTO 60,3
0
7135 POKE 765,2
7140 POSITION 60,40:X10 18,#6,0,0,"S:"
7150 PLOT 60,76:DRAHTO 60,70:DRAHTO 30,7
0
7155 POKE 765,2
7160 POSITION 30,76:X10 18,#6,0,0,"S:"
7170 PLOT 60,10:DRAHTO 60,20:DRAHTO 66,2
0:DRAHTO 80,20:DRAHTO 80,16:DRAHTO 100,1
6:DRAHTO 100,28
7175 PLOT 125,46:DRAHTO 125,50
7180 PLOT 100,24:DRAHTO 120,24:DRAHTO 12
0,10:PLOT 90,26:DRAHTO 90,40:PLOT 90,60:
DRAHTO 90,70
7190 PLOT 80,78:DRAHTO 90,70:DRAHTO 70,7
0
7195 POKE 765,2
7200 POSITION 70,78:X10 18,#6,0,0,"S:"
7210 PLOT 110,46:DRAHTO 110,34:DRAHTO 13
0,34:DRAHTO 130,20:PLOT 140,46:DRAHTO 12
0,46:DRAHTO 120,40
7215 PLOT 130,34:DRAHTO 130,38
7220 PLOT 90,50:DRAHTO 100,50:PLOT 100,3
8:DRAHTO 100,56:PLOT 150,70:DRAHTO 148,7
0
7230 PLOT 110,66:DRAHTO 110,56:DRAHTO 10
0,56
7235 POKE 765,2
7240 POSITION 100,66:X10 18,#6,0,0,"S:"
7250 PLOT 140,76:DRAHTO 134,60:DRAHTO 13
0,60
7255 POKE 765,2
7260 POSITION 130,76:X10 18,#6,0,0,"S:"
7270 PLOT 140,60:DRAHTO 132,56:DRAHTO 13
0,56
7275 POKE 765,2
7280 POSITION 130,60:X10 18,#6,0,0,"S:"
7290 PLOT 14,50:DRAHTO 20,50:PLOT 30,76:
DRAHTO 60,76:PLOT 70,78:DRAHTO 80,78
7300 PLOT 100,66:DRAHTO 110,66:PLOT 110,
86:DRAHTO 120,86:PLOT 60,40:DRAHTO 80,40
7310 PLOT 130,76:DRAHTO 140,76
7400 RETURN
7500 GRAPHICS 17:SETCOLOR 4,10,12
7505 POKE 53249,5
7510 POSITION 2,4:? #6:"CONGRATULATIONS!"
7520 FOR H=1 TO 300:NEXT H
7530 POSITION 4,8:? #6:"YOU ESCAPED--"

```

```

7540 FOR H=1 TO 300:NEXT H
7550 POSITION 3,12:? #6:"press trigger"
7560 POSITION 4,13:? #6:"to restart"
7570 IF STRIG(0)=1 THEN 7570
7600 GOTO 5
8000 COLOR D:PLOT 21,60:DRAHTO 29,60:RET
URN
8010 COLOR D:PLOT 30,61:DRAHTO 30,69:RET
URN
8020 COLOR D:PLOT 31,50:DRAHTO 39,50:RET
URN
8030 COLOR D:PLOT 30,31:DRAHTO 30,39:RET
URN
8040 COLOR D:PLOT 40,31:DRAHTO 40,39:RET
URN
8050 COLOR D:PLOT 51,20:DRAHTO 59,20:RET
URN
8060 COLOR D:PLOT 50,51:DRAHTO 50,59:RET
URN
8070 COLOR D:PLOT 61,70:DRAHTO 69,70:RET
URN
8080 COLOR D:PLOT 60,29:DRAHTO 80,39:RET
URN
8090 COLOR D:PLOT 80,41:DRAHTO 80,49:RET
URN
8100 COLOR D:PLOT 80,51:DRAHTO 80,59:RET
URN
8110 COLOR D:PLOT 70,79:DRAHTO 70,87:RET
URN
8120 COLOR D:PLOT 81,60:DRAHTO 89,60:RET
URN
8130 COLOR D:PLOT 90,41:DRAHTO 90,49:RET
URN
8140 COLOR D:PLOT 100,29:DRAHTO 100,37:R
ETURN
8150 COLOR D:PLOT 111,46:DRAHTO 119,46:R
ETURN
8160 COLOR D:PLOT 111,56:DRAHTO 119,56:R
ETURN
8170 COLOR D:PLOT 140,51:DRAHTO 140,59:R
ETURN
8180 COLOR D:PLOT 140,77:DRAHTO 140,85:R
ETURN
8190 COLOR D:PLOT 141,30:DRAHTO 149,30:R
ETURN
8200 COLOR D:PLOT 110,47:DRAHTO 110,55:R
ETURN
8210 COLOR D:PLOT 141,10:DRAHTO 149,10:R
ETURN
8220 COLOR D:PLOT 50,77:DRAHTO 50,85:RET
URN
8230 COLOR D:PLOT 30,77:DRAHTO 30,85:RET
URN
8240 COLOR D:PLOT 60,61:DRAHTO 60,69:RET
URN
8250 COLOR D:PLOT 131,20:DRAHTO 139,20:R
ETURN
8300 REM DONE!

```

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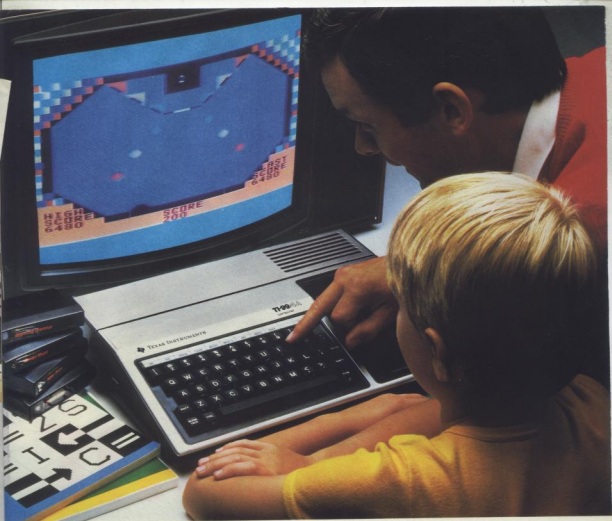
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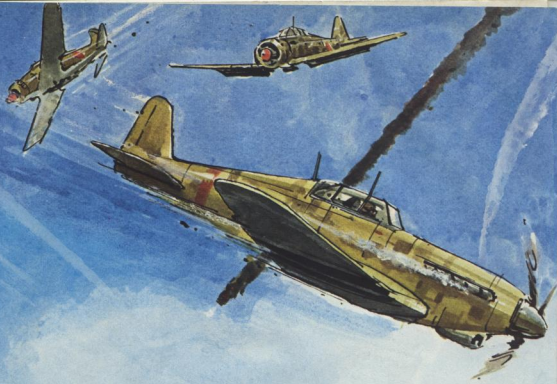
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Feature	Texas Instruments TI 99/4A
Microprocessor	TMS 9900 16 BIT
Graphics	16 colour, high resolution
Languages	TI-BASIC (built-in), extended BASIC, UCSD - PASCAL, TH-LOGO, Assembler
Memory	16K RAM standard—expandable to max ROM/RAM of 100K
Keyboard	Full size, standard typewriter style
Software	1000 programs to choose from worldwide
Solid State	Yes
Speech Capability	Yes

TEXAS INSTRUMENTS



DOGFIGHT

```

1 REM DOGFIGHT BY RICHARD BARTON, 1982
2 REM VIC20 WITH 1211A 3K HI-RES CARTRIDGE AND JOYSTICK CONTROL
4 OSCUB10000
10 SC=0:PL=0:TI#="000000"
20 X=730:Y=730:ES=195:GF=0
25 REM TARGET POSITION
26 TP1=INT(RND(1)*1000)+79:TP2=INT(RND(1)*700):PL=PL+1
27 OSCUB4000
28 IFT1#="000200" THEN I20000
40 SHRJOY(0)
41 POKEV,4:POKE$1,ES:POKE$2,ES+2
43 POKE$4,0
44 REM FLIGHT CONTROL
45 IFS=120ORS>120THENDOSUB500
46 IFS=0THENWXX=VWV
50 IFS=8ORS=9+120THENS=1
52 IFS=1THENDWXX=100:VWV=100:TP1=TP1-100
60 IFS=4ORS=4+120THENS=2
62 IFS=2THENDWXX=100:VWV=100:TP1=TP1+100
67 IFS=1ORS=1+120THENS=3
68 IFS=3THENDWXX=100:VWV=100:ES=ES+1:TP2=TP2-100
69 IFS=2&40THENS=1000
70 IFS=2ORS=2+120THENS=4
72 IFS=4THENDWXX=100:VWV=100:ES=ES-1:TP2=TP2+100
74 IFS=4RND(X*8ORS=4ANDVX=0)THENS=ES-6
76 IFTP1<60ORTP1>1823THENS=6
77 IFTP2<30ORTP2>1823THENS=6
82 IFX<0THENW=0
84 IFY<0THENW=0
90 IFE$C180THENDOSUB30000
100 GRAPHIC2
103 SCHULP
104 REM ALTINETER
105 CHRR0,0,"9":CHRR9,0,"5":CHRR18,0,"0"
106 REGION1 DRW42,60,87060:1823
108 DRW42,0,-1500+(ES#10):TO60,-1500+(ES#10)

```

```

109 COLOR0,2,7,1
110 IFX<020THENSX=1020:IFY>1820THENSY=1820
111 REM HORIZON
112 DRW42,75,X701823,Y
115 DRW42,500,182370500,970
120 GOTOT27
420 POKE$4,0
459 REM GUN FIRING
500 POKEV,10
520 POKE$4,200:GF=GF+1
523 REGION2
524 DRW42,500,97070500,0
545 REM HIT DETECTOR
526 IFTP1>400ANDTP1<550ANDS=120THENS6000
550 RETURN
999 REM CRASH SEQUENCE
1000 GRAPHIC0
1010 POKE36879,10
1020 FORI=22108STEP-1
1025 POKE36879,25
1030 POKE36864,12+I
1040 POKE36865,30+I
1050 POKE36866,150+I
1060 POKE36867,174-I&2
1070 NEXTI
1075 FORSD=14708STEP-1
1078 POKEV,80
1080 POKE$4,200:POKE$1,120:POKE$2,120
1090 NEXTSD
1100 FORI=170500:HEXIT
1110 PRINT "XXXXXXXXXXXXXXXXXXXXCRASHED-ANOTHER GO?"
1115 PRINT "XXXXXXXXXXXXXXXXXXXX"
1120 GET#="I#=" THEN I10
1130 IFR#="V" THEN I10
1140 END
3999 REM TARGET GENERATOR

```




RUNS ON A VIC 20

WITH VIC 1211A HIGH-RES

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JOYSTICK CONTROLLER.

BY RICHARD BARTON

Curse you Red Baron! You may rule the skies today but tomorrow you may find your wings have been clipped!

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But remember to keep an eye on the altimeter. Too high and the engine will stall, too low and you will crash into the ground.

So off you go into the wild blue yonder—and watch out for bandits!

```

4000 REGION7:IRAW2,TP1,TP2TOTP1+20,TP2TOTP1,TP2+20TOTP1,TP2
4005 RETURN
5000 SC=SC+1
6001 REGION2
6002 CIRCLE2,500,TP2,30,40
6004 POKES1,0:POKES2,0
6011 FOREX=1STOOSTEP-.2
6012 POKEX,EX
6013 POKES1,120:POKES4,200
6014 DE=INT(RND(1)*150)
6015 DF=INT(RND(1)*150)
6016 POINT2,430+DE,430+DF
6015 NEXTX
6020 FOR=1TO400:NEXTT
6030 GOTO205
9999 REM INTRODUCTION
10000 PRINT"VIC POKES6879,25:PRINT"XXXXXXXXXXXXDOGFIGHT"
10005 PRINT"XXXXXXXXXX R.BARTON"
10005 PRINT"XXXXXXXXXXXX HIT SCORES 1"
10010 S1=36874:S2=36875:S3=36876:S4=36877:V=36878
10012 POKEX,7
10014 READA
10016 POKES3,A
10017 READB
10018 IFB=-1THEN10020
10019 FOR=1TOB:NEXTT
10020 POKES3,0
10022 FOR=1TO20:NEXTT
10023 GOTO10014
10025 DATA195,200,201,00,195,150,207,00,209,00,215,200,219,00,215,250,0,50,219,1
50
10026 DATA220,150,219,150,215,150,207,150,201,00,195,00,207,150,219,150,0,-1
10030 POKES3,0
10050 RETURN
19999 REM END OF GAME
20000 GRAPHICS
20001 POKES1,0:POKES2,0:POKES4,0
20005 POKES6879,122
20010 PRINT"XXXXXXXXXX YOUR SCORE WAS"
20020 PRINT"XXXXXXXXXX"
20030 PRINT"XXXXXXXXXX PLANES DESTROYED"
20031 PRINT"XXXXXXXXXX PL-SC"X ESCAPED"
20032 PRINT"XXXXXXXXXX YOU FIRED"
20033 PRINT"XXXXXXXXXX ANOTHER GO? Y / N"
20040 GETA:IFR="":THEN20040
20050 IFR="Y"THEN10
20060 END
29999 REM ENGINE STALL
30000 POKES1,0:POKES2,0
30010 ED=INT(RND(1)*20)
30015 FOR=1TOED:NEXTT
30017 IFED=10THEN40000
30020 RETURN
40000 FORC=ESTO244
40010 POKES1,CP:POKES2,CP+1:POKES3,CP+2
40020 NEXTCP
40030 GOTO10000

```




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230 D=15410:IFPRINT#8,S;
240 IFPEEK(G)=91THEND=0+1:BOT0240ELSEPOKE,91
250 IFPEEK(32000)=191ANDPEEK(32001)=191THENX=USR(0):BOT0320
260 D=191
270 READA:IFA=0THEN300
280 PRINTSTRING$(A,C):;IFC=191THENC=128ELSEC=191
290 GOT0270
300 FORY=64T044STEP64:FORX=0T062
310 POKE16384+Y,X,PEEK(Y+X+15360):NEXTY
320 PRINT#262,STRING$(3,128):PRINT#222,STRING$(3,128):FORV=15487D16256STEP64:
FORX=1T062STEP3
330 IFPEEK(X+Y)=128THENPOKEY+X,46
340 NEXTY:NEXTX
350 PRINT#472,CHR$(191)STRING$(4,131)" "STRING$(4,131)CHR$(191);
360 PRINT#536,CHR$(191)" "CHR$(191);
370 PRINT#600,CHR$(191)STRING$(4,176)" "STRING$(4,176)CHR$(191);
380 IF550000THEN400
390 POKE15492,140:POKE15854,140:POKE16314,140:POKE15952,140
400 POKE15838,128:POKE15966,128:POKE15902,128
410 POKE15489,76:POKE16257,76:POKE15549,82:POKE16317,82:POKE15551,32
420 ONINT(S/8000)+1BOT0440,450,460,470,480
430 GOT0480
440 POKE16031,140
450 POKE15775,140
460 POKE15516,140
470 POKE16290,140
480 X=USR(1)+C=15360+K=14400+D=15361:B=164
490 Y=B*6:X=0:F=1
500 D=1
510 FORB=1T03:Y(G)=30:Y(B)=512:NEXT
520 GOT0710
530 P=PEEK(K):DNP/8BOT0620,630,710,640,710,710,710,650
610 GOT0710
620 D=0:M=64:BOT0660
630 D=2:M=64:BOT0660
640 D=3:M=3:BOT0660
650 D=1:M=3
660 IFPEEK(M+X+Y)=128THEN720
670 Z=PEEK(M+X+Y):IFZ=46THENS=B+30:POKEY+Y+M+31604,128:PRINT#8,S:B=B-1:IFB=0T
HEN200ELSE720
680 IFZ=82THENS=0:BOT0730
690 IFZ=76THENS=60:BOT0730
700 IFZ=140THENS=B+300:POKEY+Y+M+31604,128:J=20:PRINT#8,S:B=B-1:IFB=0THEN200ELS
E720
710 M=0
720 IFABS(M)=64THENY=Y+MELSEX=X+M
730 PRINT#X+Y,Y#(D,F);
800 IFJ=0THEN820
810 J=J-1:IFINT(J/2)=0J/2THENFORB=1T03:V=0:W=T=X(Y)+Y(G)+C
820 FORB=1T03:H=0:V=0:W=T=X(Y)+Y(G)+C
830 IFX(G):XTHENH=-3
840 IFX(G):XTHENH=3
850 IFY(G):YTHENV=-64
860 IFY(G):YTHENV=64
870 IFT-C+V+X+YQRT-C+H+X+YTHEN1200
880 IFJTHENH=-H:V=V
890 IFPEEK(T+H):128THENH=0
900 IFPEEK(T+V):128THENV=0
910 IFH+V=0THEN950
920 IFH+V:0THENIFRND(2)=1THENI=V:BOT01040ELSEI=H:BOT01040
930 IFH=0THENI=VELSEI=H
940 BOT01040
950 ONRND(4):BOT0960,970,980,990
960 IFPEEK(T+3):(129THENI=3:BOT01040
970 IFPEEK(T-3):(129THENI=-3:BOT01040
980 IFPEEK(T+64):(129THENI=64:BOT01040
990 IFPEEK(T-64):(129THENI=-64:BOT01040
1000 IFPEEK(T+3):(129THENI=3:BOT01040
1010 IFPEEK(T-3):(129THENI=-3:BOT01040
1020 IFPEEK(T+64):(129THENI=64:BOT01040
1030 BOT01070
1040 IFPEEK(T+1)=32THEN1070
1050 IFABS(I)=3THENX(G)=X(G)+IELSEY(G)=Y(G)+I
1060 POKEY(G)+Y(G)+C,32
1070 NEXT
1100 IFJ:76BOT0120
1110 Z=USR(0):FORB=1T03:PRINT#X(G)+Y(G),G$:NEXTY:F=F+1:1:BOT0500
1120 Z=USR(0):FORB=1T03:PRINT#X(G)+Y(G),R$:NEXTY:F=F+1:1:BOT0500
1200 IFJTHENL=100*(10-INT(J/2)):PRINT#X+Y-1,L:SB=5+L:FORB=1T020:PRINT#X(G)+Y(G),
Y#(D,F):FORZ=1T020:NEXTY:F=F+1:1:NEXTX=X(G)+Y+Y(G):H=0:Y(G)=512:X(G)=30:PRINT
#8,S:PRINT#720
1210 PRINT#X+Y+1,"#":FORB=1T0400:NEXT
1220 PRINT#X+Y,"":('):FORB=1T0400:NEXT
1230 PRINT#X+Y,CHR$(153):CHR$(179):CHR$(166):FORB=1T0400:NEXT
1240 POKE15405,PEEK(15405)-1:IFPEEK(15405):48THEN490
1250 PRINT#X+Y,"":PRINT"539, GAME OVER";
1260 IFB:ET=ENPOKE31001,S/256+POKE31000,S-PEEK(31001)*256
1300 RESTORE
1310 READA:IFATHEN1310
1320 PRINT#960,IFB=OCLS
1330 READA:PRINT#TAB(32-LEN(A#)/2):A#
1340 IF#A:0"THEN1330
1350 Z=0:AS=INKEY#
1360 Z=Z+1:IFZ(1000ANDINKEY#="")THEN1360
1370 IFZ=1000RUN
1380 RUN40
1390 BOT0600
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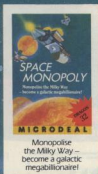
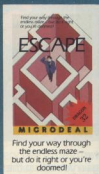
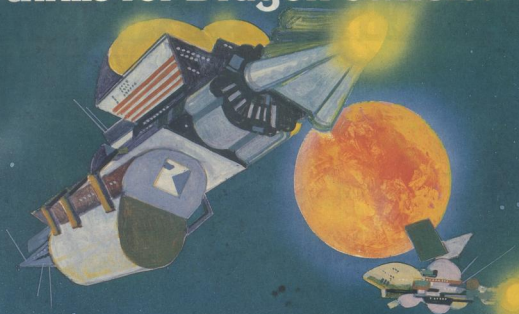
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THE SEVENTH EMPIRE

THE best way to learn history is from the crusted carapace of a Tiaithan. All the Shell Tribes share the same lyrical tones which turn Fivespeak into a language almost capable of poetry, but the Tiaitha, being Machen — data memorisers — can provide the fullest detail.

Perhaps it is just because I first heard the story of The Seventh Empire beside Tiaithan fires that I feel this way, but I still remember the night when their fleet put down in the plains beyond our cities.

Hakub I is the unromantic name for our planet, the only inhabitable planet in the Hakub System but rich in heavy metal and one of the first "greenhouse" planets to be seeded.

That moon phase the word had gone out that a Tiaithan Fleet had landed to trade and all the local merchants had rushed to greet them — they had come from a rich system.

I was taken out to see them on the third night. There was no current war in the system, and an eager crowd surrounded their fires as the wind swept through the plain and some 30 Tiaithans came out to recount the tale.

Someone beside me pointed out a group of Debeshi Pirates, whose craft landed close by, and who were mingling among us to hear the tale. Now I wonder how it was they weren't run off the planet, then I merely drank in the rich detail of the story telling and lost myself to the saga of D'Taan and her Rebel Empire.

She belonged to a human tribe — the Jellied Ones as the hard-skinned Shell People still call us — and was a lowly scientist on an exploration ship based in the Fanus System.

In those days the galaxy knew only five empires, communication between them was rare — as was interstellar travel — and only a handful of interpreters understood the now widespread Fivespeak language.

Stellar energy was the currency then and it was in the hands of the **Bloodline Empire** named after the species which dominated both that empire and the energy reserves. The Bloodline was the name given to a tribe of smooth-skinned reptilians who could reproduce so accurately — cell-by-cell they claimed — that they were one of the few societies in the known galaxy never to have developed clones.



The Bloodline had been the first colonisers of the galaxy and had monopolised stellar energy reserves on the few planets which housed them. These were usually the hot heavily atmospherised greenhouse effect planets and few of these could be developed even by the hardy and technologically advanced Bloodline.

So, stellar energy was in short supply and that way the Bloodline claimed control over the inter-system travel and held the other four empires in check.

The Shell People, evolving swiftly out of their natural amphibious environments, were probably the biggest force in the collection of species known as the **Water Empire**.

We poor humans being too short-lived to achieve much as space travellers had still been able to establish colonies across great tracts of space using mercenary-controlled craft and suspended animation and had found a small voice among the creatures concerned with the physical sciences.

We were highly rated as colonisers as the least volatile of



Illustration: Duncan Cross

racers and also for our suitability to colonise the group-B oxygen-atmosphere planets which produced the small amethyst-type gems used to harness the stellar energy. Ours was nicknamed the **Amethyst Empire**.

The smallest empire was the province of the sun beings. Only two species found their way to prominence through solar power and the **Sun Empire** was among the most elusive in the galaxy.

The largest empire in sheer weight of numbers were those from the frozen or dead planets who were equipped to survive environments where even the most technologically capable beings would not attempt to mine or set up colonies.

Many creatures had evolved in the **Dead Empire** but they were universally slow-witted and would have doubtless been amalgamated by a more go-ahead rival if any had seen much use to be made of the dead planets. None did and so by default the **Dead Empire** came into existence and earned a galactic voice.

So each empire found its own niche in the galactic system, their dependents seldom straying from their own environment and

never indulging in travel beyond their own solar system without the grudgingly given energy of the Bloodline.

Despite the seeming rich variety of creatures, there was still much of the galaxy which was without inhabitants or prospects. Diverse as galactic kind was, it still only occupied a narrow band of planet and star systems.

Of these the greenhouse effect planets with their ability to produce the stellar energy and rich seams of heavier metals were regarded the deepest loss.

The Sun Polyps were a well known but little investigated phenomena. Consisting of little more than a few cells they inhabited the very edge of planetary atmospheres in their trillions.

D'Taan was investigating them for her tribe, colonists of a Bloodline controlled solar system. Little importance was attached to her work, she hoped to discover how the creatures had managed such a widespread distribution over the galaxy.

A controlled colony was set up as part of her experiments on a new planet — just beyond the life ring — too close to its star to have anything really worthy of the name atmosphere.



As luck would have it, D'Taan had chosen a creation generation to transfer and when the exploration ship called back five solar years later, the planet, classified as Solar Desert Type-B had grown cloud cover.

A shuttle sent to the planet's surface came down in the middle of a rain storm and, while the heat was such that only a sun-being could have stood it un-suited, the atmosphere was doing its work. Of the polyps there was no sign — they had gone into catatonic generation and died out.

D'Taan was quick to realise the importance of the discovery, Bezel, the Gorgan captain of her craft was quicker. He stopped the news being keyed into the ship computer which was transmitting all experimental data to the nearest space station, from where it would be sent to Bloodline databanks.

D'Taan's work had told her something about the polyps' four generation evolution cycle. She estimated a Creation Generation occurred every 50 solar years.

And her other experiments had shown that only creation generation polyps actually survived the transmission to a new planet — and then only for a few years.

A brief discussion with Bezel convinced D'Taan that the Bloodline would put a stop to her work to preserve their galactic control. They had to break the bounds of the Bloodline Empire and make for an uninhabited system with polyps of a different generation. They needed stellar energy quickly.

The raid on the Bloodline space station in the Janus system was when piracy first came home to roost in the galaxy.

Prior to that, the stellar energy had been under such control that none could make good their escape to a new system. Janus was not an energy system but it did have a small supply which Bezel knew was kept on the station for passing inter-system Bloodline freighters.

It was only Bezel's inside knowledge of the station which made the raid possible. As it was there was just enough power to rush them into the neighbouring system of Vepoz.

Uninhabitable with four planets, said the exploration charts. But it had everything D'Taan needed to continue her next experiment, polyps had been charted on a dead planet,

and there was an unstable greenhouse effect class C planetoid closest to the sun — rich in stellar energy which no one could currently mine.

Armed with a cryogenic chamber and a desperate hope that by the time an inter-system Bloodline cruiser reached Janus, their trail would be cold, Bezel put the craft in orbit around the polyp's planet and the crew to sleep until D'Taan's estimated creation generation came round.

The creation generation reached maturity, was duly transferred to Vepoz I and after five further years in the "freezer", Bezel and D'Taan had a stable planet shielded from the

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sun's rays by a growing atmosphere and that elixir of all life, water. But more important they had access to stellar energy.

The Pirate Empire was born over the next years, fuelled by stellar energy and run by Bezel, it struck where it wanted, turned two further planets into stellar supporters and ran the other empires and the Bloodline ragged.



D'Taan split from Bezel, who threatened to rule the galaxy in his lifetime and continued her experiments with polyps while on the run from the Bloodline and most of the other empires, stirred up by her former colleague's atrocities.

There were many questions still unanswered about polyps but the two most important for D'Taan were: why a colony artificially transferred to a new planet always died out and her original puzzle: how could the polyps be so widespread over the galaxy.

The answer lay in the pattern of distribution which she mapped out from stolen empire surveys of the charted systems. Polyp colonies always seemed to spread outwards from a Neutron Star system.

Neutron Stars, are stars whose energy has been spent and the

mass has folded in on itself, the density and gravitational pull of these dead suns caused strange effects on space and they were avoided as navigational hazards. Could they so distort space as to allow travel through to other Neutron Stars.

D'Taan's mind struck upon an ancient hypothesis. Space was curved but how curved? Could there be areas which pulled by the distortion almost doubled back on themselves.

If you looked at the universe as a ring with two planes then a simple twist would turn that ring into a mobius strip with just one plane.

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even fourth dimension and then what would you have? black holes rent the fabric of the universe, perhaps a Neutron Star was also capable of this, pulling great folds of universal fabric around it and perhaps matter could punch its way through to a part of the galaxy which was light years away by normal means.

Seven years D'Taan spent on the problem before a Bloodline ship finally tracked down her craft and seized herself and the crew. She was frozen and taken back to Grakta, whose voice was loudest of the Five Empires which, split by Bezel's pirates, were now at war with one another.

She was taken into the presence of mighty lizard who had spoken for the Bloodline Empire for over eight generations of himself, no-one but Bloodliners themselves knowing when one Grakta died and the next took his place. With him was a token representative of the Dead Empire, — his only current ally — an ice warrior there as a symbol, whose name was never asked or recorded.

Death was the sentence for unleashing anarchy on the galaxy and creating the sixth Pirate Empire. But D'Taan still had an ace to play, Gateway

Stars. She outlined her experiments to a disbelieving Grakta and showed him a way to defeat Bezel's ambitions.



Grakta scoffed but she persevered and demanded two things in return for the secret of the Gateways across the known galaxy. She wanted an empire herself, named after her and devoted to science. And she wanted the secret of the Gateways to be shared across the empires so that none would have the advantage over the other that the Bloodline had enjoyed for so long.

"No", was Grakta's answer. "You die and we fight the pirates as best we can." They were the last words he spoke as an ice warrior's tribal axe buried itself deep in his back. It was the only time that an emissary from those Dead Planet's had acted so swiftly and so decisively.

The ice warrior turned to D'Taan: "You shall have your request and Bezel shall lose his advantage over us".

The Dead Empire, armed with the science of D'Taan's new-found Empire and backed by the Sun Empire's solar troops, met and defeated Bezel at a mighty battle in the Yuses system.

A conquered Bezel sought out his conquerors and the Treaty of the Seven Empires was sworn. It split the galaxy's habitable systems between all seven, it restricted any tribe to no more than seven space fleets, so that no army might ever again grow to threaten the whole empire and it allowed for the inevitable bickering and warfare which would break out.

Most important was the Dead Empire's insistence that the empires be disbanded and that the peoples of the galaxy revert to the tribes and species from which they had come. There was compromise and the empires ended up as figure heads, destined in the course of time to be given into the hands of seven computer controlled ships which react to the data the tribes affiliated to planets in each empire feed into them.

That was the saga of D'Taan, who died before the battle of Yuses, as told to me by the Tiahi one magical night on the plains of Hakub I.

Fitting because D'Taan's sun polyps seeded the atmosphere of Hakub I releasing its stellar energy to the miners and colonisers and merchants, of which I am now one.



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GO

Let's see what proverbs we can devise for a simple extension to the program outlined in the previous Go articles. We got as far as random selection of a move within a set of boundary intersections.

Each boundary intersection is defined as being next (considering up to the nearest eight intersections) to both a black and a white stone — see figure 1.

"Don't play where you can get captured next move" is rather an obvious maxim. All the points marked A fall into this category and therefore should be eliminated from the set of boundary intersections.

Then there is the well known proverb — "Your best play is often your opponent's best play". The logical converse of this proverb is "Your worst play is often your opponent's worst play". By this token the point marked B should also be eliminated — if it's a bad move for your opponent it's a bad move for you.

Having eliminated some bad moves, let us now move on to rank the remaining possibilities. We have a choice of optimising for defence or for attack. Since you are never so vulnerable as when you attack inexpertly, and considering our program's capabilities (so far) we shall tackle defence first.

A main tactic of attack is to isolate your opponent's groups by placing stones where those groups would otherwise join. Small groups have fewer liberties (adjacent vacant intersections) and so are easier to kill.

The moves to isolate stones are called "cuts" and "peeps". The white stone at E7 in figure 1 is an example of a peep.

A further move by white at E8 would seriously threaten the life of the four black stones to the left. A black stone placed at B2 is an example of a cut.

It separates the one white stone from the two above. "Block peeps and cuts" is advice well worth taking. In our defensive posture we will give such moves priority.

Even though a group might be cut off from another, it can still make territory and avoid capture if it gains enough liberties. Thus we should try to observe the proverb

The rules of play are very simple so you might expect that a few golden principles would enable a computer program to play well. Not so! Nevertheless there are hundreds of books on how to play Go — a fair number of them, English translations from the original Japanese. So surely it must be a matter of transferring the book knowledge into the computer and hey presto!

The trouble is that the proverbs, maxims and hints are all couched in far from concrete terms. Take the proverb "Play away from your opponent's strength." All very well but exactly how far away? How do you judge the strength of your opponent's positions? And then there are the inevitable exceptions to the rule to ponder! The most important Go proverb of them all is "Don't follow Go proverbs blindly!"

— "Maximise the liberties of your groups". We can do this by awarding higher priority to moves that gain more liberties.

Even with these proverbs, carefully selected for ease of implementation, there still remains a fair amount of design acumen needed to keep the programming simple and efficient.

The selection table defines a pattern recognition method which falls short of obeying the proverbs to perfection but does cover most situations.

The intersections next to each boundary intersection are examined to see which is the first pattern to match and then the appropriate action is taken.

For example we could hold the

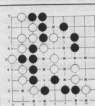


Figure 1
Computer — black
Human — white
A&B points
eliminated
Points marked X
remain

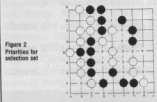


Figure 2
Priorities for
selection set

first pattern as a byte string with values representing the matching instructions W, N/B, W, X, N/B, X, W, B.

Starting with North and proceeding in a clockwise direction each intersection is matched against the appropriate instruction. If all succeed i.e. North holds a white stone, North-East does not hold a black stone etc., the appropriate action is taken.

At the first failure the next pattern must be examined or at least the same pattern in the next of its four orientations. This can be done by starting with the East intersection. Note that N/B and N/W instructions include off board imaginary intersections so that points at the edge of the board can be matched against the same patterns.

Thus N/B means white, vacant or off board, and N/W means black, vacant or off board. By matching the patterns in this fashion it is possible to hold all the patterns in 88 bytes.

Figure 2 shows the final rankings.

Selection Table										Action	
B	W	%	%	W	B					Eliminate	
W	W	W	W	W	W					from	
X	%	X	X	%	X					selection	
W	B	%	%	W	B					Eliminate	
B	B	B	B	B	B					from	
X	%	X	X	%	X					selection	
X	W	X	W	B	X					Priority	
B	B	B	B	%	W					= 7	
X	X	X	X	%	X						
%	B	%								Priority =	
X	X									3+	
X	X	X								liberties	
B	B	%	%	B	B					Priority =	
X	X	X	X	X	2+						
X	X	X	X	X	X					liberties	
B	B	B								Priority =	
X	X	X								1+	
X	X	X								liberties	
X	%	X								Priority =	
%	B	%								liberties	
X	%	X									

KEY: B must be black
% mustn't be black
W must be white
% mustn't be white
X don't care

NOTES:
1. Take 1st match in strict order
2. % W include off board intersections

MACHINE CODE

TRY THE GO FASTER CODE

Home computers are designed to make it easy for us to type in, list, edit, save, load, and run Basic programs.

It is so easy to use Basic on these machines that we need a very good reason to take the trouble of using any other programming language.

The most common reason for getting away from Basic is that it is too slow for some applications; moving

We can use the same idea with other numbers than 10; if we use 2 instead of 10 we only need two digits, 0 and 1, and the positions of the digits, counting from the right represent units, twos, fours, eights, sixteens, etc., each position counting for twice as much as the position immediately to the right. Thus, the binary number 11001011 means one 128, plus one 64, plus no 32s, plus no 16s, plus one 8, plus no 4s, plus one 2 plus one 1, which works out to the decimal number 203.

We can convert numbers from binary to decimal as in the example

Reading the column of remainders from bottom to top gives 11001011, the binary equivalent of the decimal number 203.

These strings of binary digits (or bits) are not easy to work with; we generally need to use binary numbers 8 or 16 bits long, and it is very difficult to remember them and to copy them correctly. To get numbers that are conveniently short we generally use *hexadecimal* or base 16 numbers. In base 16 we need 16 digits, from 0 to 15, and we use the letters A to F for the digit values from 10 to 15.

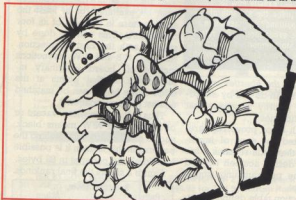
The digits have positional values as in decimal and binary, but this time the values are multiplied by 16 as we move to the left. To take an example, the hexadecimal number 1A30 means one 4096 plus ten 256s plus three 16s plus no 1s, which works out to 6704 in decimal.

For numbers up to decimal 15 we can convert between binary and hex (short for hexadecimal) by a simple table:

Decimal	Binary	Hex
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

We can also use this table in converting larger numbers between binary and hex.

To convert from hex to binary we simply replace each hex digit by the four binary digits from the table, for example, hex 1A30 becomes binary 0001101000110000. To convert from binary to hex, we divide the binary number into groups of four digits, from the right, and replace each group by the corresponding hex digit, for example binary 11001011 gives the two groups 1100 and 1011, so the hex equivalent is CB.



graphics in interactive action games, the calculation of the computer's move in complicated strategy games, and the searching of large amounts of data in Adventure-type games are just a few examples.

The fastest response that can be obtained from a computer comes from machine code, but before we look at what this means we need a little background information on number systems and the internal organisation of a computer.

With ordinary decimal numbers, we use a positional principle in order to represent numbers of any size by combinations of 10 different digits, 0, 1, 2, ..., 9. The amount a digit contributes to the number depends on the position of the digit; the rightmost digit represents units, the next digit to the left represents tens, the next digit to that represents hundreds, and so on. The decimal number 203 thus means two hundreds plus no tens plus three units.

above, by adding the position values for the 1s in the binary number. To convert from decimal to binary we divide by 2, recording the result and remainder, and repeat the process on the result until we reach zero; the remainders in reserve order give the binary number. To illustrate this, let us look at the conversion of decimal 203 to binary:

203 divided by 2 gives 101, remainder 1
101 divided by 2 gives 50, remainder 1
50 divided by 2 gives 25, remainder 0
25 divided by 2 gives 12, remainder 1
12 divided by 2 gives 6, remainder 0
6 divided by 2 gives 3, remainder 0
3 divided by 2 gives 1, remainder 1
1 divided by 2 gives 0, remainder 1

BY TED BALL

MACHINE CODE

Because of this direct conversion we can regard hexadecimal notation as an abbreviation for binary, and instead of 8 bit or 16 bit binary we can use 2 digit or 4 digit hex, which is much easier to use.

If we now look at the way a computer system is organised we can see why binary numbers are used. Figure 1 is a simple block diagram of a computer system CPU which stands for Central Processing Unit.

This is the part of the computer that does all the calculations and in a microcomputer the CPU is a single integrated circuit called a *microprocessor*.

operated by the presence or absence of a voltage. We can thus represent the data bus by an 8-bit binary number and the address bus by a 16-bit binary number, where a 1 means there is a voltage on the line and a 0 means there is no voltage on the line.

Machine code programs are actually patterns of 1s and 0s in the memory, which we represent as binary numbers (or in abbreviated form as hexadecimal numbers). The processor can only work with these binary numbers, but it is almost impossible for human beings to do so.

To show what assembly language looks like and to see how completely different the three processors

	6502	
A902		LDA #2
18		CLC
6902		ADC #2
8D0010		STA \$1000
	Z80	
3E02		LD A, 2
C602		ADD A, 2
320010		LD (1000H), A
	6809	
8602		LDA #2
8B02		ADDA #2
B71000		STA \$1000

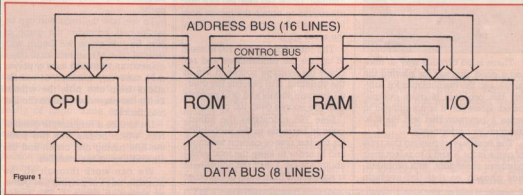


Figure 1

ROM is Ready-Only Memory, and is used for permanent storage of programs and data; the Basic interpreter and all the control programs that make the computer work are stored in ROM.

RAM stands for Random Access Memory; the name does not describe the most important point, that it's possible to write new programs and data into the RAM. I/O stands for Input/Output, the connections between the computer and the outside world: keyboard, TV display, tape recorder, printer.

The various parts of the computer are joined into a single system by three sets of connections, the Control bus (which we can ignore as it cannot be affected by programming), the Address bus, and the Data bus (a bus is just a group of connections).

The home computers we are dealing with have eight data line and 16 address lines which are

We actually write our programs in a language that has meaningful names for the machine instructions and allows us to use meaningful names for our data, then we translate into the binary numbers the processor needs.

The meaningful language is called **assembly language** or **assembler**, a program written in assembly language is called **source code** and the translation of the source code into binary or hex is called **object code**.

There are many microprocessors, each having its own machine code and assembly language, but only three are used in home computers: the 6502 (Pet, Apple, Acorn, Atom, Vic-20 and BBC Micro), the Z80 (ZX80, ZX81, ZX Spectrum, Sharp MZ80K, TRS-80), and the 6809 (so far used only in the TRS-80 Colour Computer and the Dragon). We will be looking at all three in detail later.

are, let us look at a simple program to add 2 and 2.

The object code (in hex) is on the left and the source code on the right.

In all three programs the same principle is used; load the number 2 into the processor, add 2, and finally store the result in memory location 1000 hex.

There are, however, several differences in the details of the source code.

Because the assembly languages are so different you will have to stick to learning just the one for the computer you have.

You will need a text book to refer to the precise details of the assembly language and the corresponding machine code.

There are many books available, some dealing with a particular model of computer and others dealing with the microprocessor without reference to any particular model.

PRACTICAL PROGRAMMING

- 3) If player 1 makes move 1, make move 1, 2
 If player 2 makes move 2, make move 2, 1
 If player 3 makes move 3, make move 3, 1
 4) If player 1 makes move 1, make move 1, 2
 If player 1 makes move 2, make move 2, 2
 If player 1 makes move 3, make move 3, 1

We can now make up a table similar to those for the earlier games, with a 1 meaning a win for the first player and a -1 meaning a win for the second player:

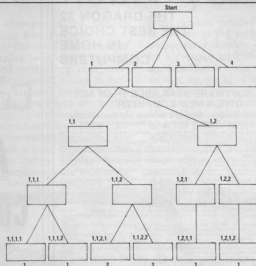
		2nd player's strategy			
		1	2	3	4
1st	1	1	1	1	-1
player's	2	1	1	1	1
strategy	3	-1	-1	-1	-1

Of course, it becomes more difficult to carry out the reduction of a game to a table when there are more moves, and this procedure is really of importance only in the mathematical theory, where it is convenient to be able to treat any game in a completely abstract fashion as just a rectangular array of numbers.

For a practical method of playing a game will we need to go back to figure 1 and look at it in more detail.

From the point of view of player

Figure 2



1, the tree has three branches going of from the start position. If we look at the lowest entries under each branch we find, under branch 1 a win for player 1 and a win for player 2, under branch 2 only wins for player 1, and under branch 3 only a win for player 2.

It is clear from this that player 1 can always win by making move 2.

For a more complicated example, consider figure 2 which shows part of a larger tree, using the same

notation for labelling the moves or positions and with the numbers along the bottom showing which player has won.

If we look at the final positions following move 1 we see that in some cases player 1 wins and in some cases player 2 wins. However, by looking one level down we see that if player 2 makes move 1, 2 player 1 will win, while if player 2 makes move 1, 1 player 1 can win by making move 1, 1, 1.

```

10 DIM p(2,3): DIM g(2): DIM a 240 FOR v=1 TO 3
(2): DIM b(2) 250 PRINT p(u,v): " "
20 LET p(1,1)=.333: LET p(1,2) 260 NEXT v
= .333: LET p(1,3)=.334 270 PRINT
30 LET p(2,1)=.333: LET p(2,2) 280 NEXT u
= .333: LET p(2,3)=.334 290 LET y=y+100
40 DIM i(3,3) 300 FOR u=1 TO 2
50 FOR i=1 TO 3 310 LET b(u)=b(u)+g(u)
60 FOR j=1 TO 3 320 LET a(u)=b(u)/y
70 READ s(i,j) 330 LET g(u)=0
80 NEXT j 340 NEXT u
90 NEXT i 350 GO TO 110
100 LET y=0 500 LET p=0
110 LET x=0 510 LET u=1
120 LET x=x+1 520 LET r=RND
130 PRINT AT 0,0:y+x 530 FOR n=1 TO 2
140 LET v=1: GO SUB 500: LET i= 535 LET p=p+p(v,n)
u: REM Row player's move 540 IF r<p THEN LET u=u+1
150 LET v=2: GO SUB 500: LET j= 550 NEXT n
u: REM Column player's move 570 RETURN
160 LET s=s(i,j) 700 LET g(u)=g(u)+s
170 LET u=1: LET v=i: GO SUB 70 705 LET d=.001*(a(i)-g(u))/x
0: REM Update row probabilities 710 LET p(u,v)=p(u,v)+d
180 LET s=s 715 LET l=v+1
190 LET u=2: LET v=j: GO SUB 70 720 IF l>3 THEN LET l=1
0: REM Update col probabilities 725 LET m=l+1
200 IF x/100<INT(x/100) THEN 730 IF m>3 THEN LET m=1
GO TO 120 740 LET p(u,l)=p(u,l)-d/2
210 CLS 745 LET p(u,m)=p(u,m)+d/2
220 PRINT AT 3,0: 750 RETURN
230 FOR u=1 TO 2 800 DATA -1,1,1,2,-2,2,3,3,-3

```




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LOOK MUM, NO WINGS

Along with about a quarter of a million other people, I went to Farnborough last month to see the flying display. The planes and the displays can provide the inspiration for computer games and a wealth of ideas for graphics — both static and mobile. Being able to see the planes, whether in the static display or in the air, reinforces very strongly the importance of being able to see a complex object from many different points of view in order to be able to appreciate its overall shape and structure, and hence perhaps its function. Only the combination of several rather special views of a plane such as the Rockwell B-1 can reveal the way in which its shape has been designed to reduce its visibility to radar systems. This kind of experience should inspire anyone to polish up his program for displaying three-dimensional shapes and using hidden line removal.

The exhibition of aviation hardware is vast, and it is surprising — although perhaps it should not be — to come across the names of firms familiar to users of personal computers — Thorn-EMI to name one.

What is particularly striking is the number of manufacturers displaying computers and video displays. The graphics capabilities being demonstrated by various manufacturers were quite remarkable, particularly by comparison with what is available for video games and personal computers.

The major applications for graphics were in instruments displays and simulation.

The most advanced instrument panel systems for aircraft cockpits all include a cathode-ray tube on which any individual instrument display can be shown as required. Raster-scan technology is naturally used to generate the display on the C.R.T., and the visual display is composed of dots, just as on a personal computer. However, liquid crystal display technology is used for the display surface.

Any changes to the display occurs, in human terms, instantaneously due to the combination of the display technology and the powerful controlling computer. Carefully designed visuals to indicate the artificial horizon or the weather pattern ahead are readily comprehensible to the layman, and must be invaluable to a trained pilot.

More immediately appealing are the visuals in flight simulators. One simulator being displayed by Redifon Simulators gave wide-angle visuals, so that a simulated view

flying requires detailed and realistic images as are technically and economically possible. A program for a personal computer could be highly effective while falling well short of the quality of flight simulator graphics.

In any event, the display must be of very high resolution with access to a full palette of colours all of which must be available in varying intensities. This implies that very large screen memories are necessary — larger than can be addressed by eight-bit micro-



from the cockpit is provided for all the windows. The visuals representing airports in all conditions from daylight to darkness, and including in between, dusk and foggy conditions, are realistic and convincing.

If personal computers are to be able to display the sort of graphics used in flight simulators advances are needed in both hardware and software compared to what is generally available now. This begs the question of whether it is necessary to reproduce the graphics precisely on a personal computer.

To convince a pilot in a simulator to take his experience seriously and make him believe he is actually

processors — so that a 16-bit machine is needed. It would be needed to produce realistic mobile graphics with such images.

The programming expertise necessary to write programs generating such graphics is mostly contained within the companies involved in making the simulators.

The only program known to me that has graphics remotely approaching the level of flight simulators is a Jumbo jet landing program for the Atari. The Atari machines, incidentally are probably the only current personal computers able to display the necessary images.

As all this graphics capability and technology already exists in the aviation world, there is no reason why it should not be borrowed and adapted by the games and computing sector, as long as it can be delivered at the right price.

Illustration: John Davis

BY GARRY MARSHALL

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SANTA'S CHOICE

RADIO CONTROL

In the early days of radio controlled cars, the returns rate was nothing less than horrendous. This was due to many problems but was not helped by the customer having to pay out upwards of £10 for batteries and a licence to be able to play with the vehicle.

Initially, British suppliers (most imported the vehicles) rushed into this area and failed to check quality and many toy buyers dipped their toes in the water and ran like mad when the product was returned.

The buyers left most ranges alone during 1981 but having been convinced of the quality of ranges such as Corgi (now manufactured in Japan) have once again stocked in depth. A recharger unit and rechargeable batteries are recommended.

Programmable vehicles have not suffered from the same quality aspects. Unfortunately the number of items available is very few.

Best Buys in this category are: **VW Turbo Rally Car** by Corgi a realistic model with digital proportional steering. It has five separate functions — forward, reverse, turn left, turn right and stop and costs between £33 and £40.

The **Honda Superbike** by Corgi is another realistic model with detachable rider; proportional steering with transmitter. Engine revving and running noises.

Electronic Toys that relied on the famous "chip" were first introduced to the British Toy Trade in the Autumn of 1978.

Since then, we have seen four different generations come and go — some hugely successful, the majority completely the opposite. There have been hand-held games, table top games and most recently credit card size pocket games.

Whilst these have been introduced, throughout the traditional items have remained and I suppose could now be called staple games.

This has of course affected the toy industry and sales of electric train sets and motor racing sets have suffered, in fact collapsed. Also traditional games have suffered as electronic toys (not including television games) have taken over 10% of the actual toy sales.

What do you look for when buying an electronic toy?

Well firstly, as with television games and cartridges, there is game play. Also, and probably most important, there must be a good back-up by the manufacturer/importer, such as after-sales service.

Let's look at the varying types of electronic toys. There are mini-arcade games (both hand-held and table top versions), basic family challenge games, watches incorporating games, vehicles — radio controlled and programmable and learning aids basically for the younger child.

Functions — forward, turn left, turn right and stop. Between £26 and £32.

Bigtrak by Milton Bradley must be the best known of all electronic vehicles, having appeared on many television programmes that are concerned with the famous chip.

It can be programmed to travel forwards, backwards, left, right, turn, spin or fire its photon cannon.

Bought separately, the Bigtrak Transporter can be linked to the vehicle and programmed to haul loads and dump them on command.

Bigtrak is priced between £27 and £40 and the transporter costs from £14 to £20.

FAMILY FUN

The area of family challenge games is most confusing. You have items that were introduced in the first year of electronic toys and remain strong sellers as they are now regarded as staples.

On the other hand you have the 'gimmicky' items that arrive with a lot of ball hoo and that is all that can ever be said of them — they have 'died' just as quickly as they arrived.

A common fallacy with toy manufacturers is that if you change a highly successful line and introduce either an up-market or down-market equivalent, success is guaranteed. This has also happened to basic electronic family/challenge games.

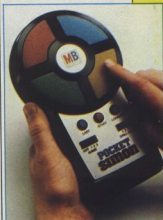
The prize winner was Computer Perfection. Perfection as a standard shape sorter game has been a huge success for the last six years. Computer Perfection was added to the range in the US in 1979 and in the UK in 1980 and played basically the same way but electronically. Unfortunately the item lasted only two years in America and was finished (if it ever started!) after one year in the UK.

One exception has been Computer Battleships,

which was accepted as the first ever electronic game in the UK in 1978 and has sold well ever since. When you think that the standard game still costs only around £7 and the electronic version is around £30-£35 it makes you wonder.

Best buys here are, the **Simon Family** by Milton Bradley. Simon was one of the earliest items onto the market place. It was followed by Super Simon and Pocket Simon. All three are still available and make up a most compact family range. The idea of the game is to repeat after 'Simon' (as in the child's game Simon Says) the colour sequences as quickly as possible. If you are correct the lights and sounds go faster, if you are wrong Simon blows a raspberry and it's back to square one.

Super Simon includes several variations and costs between £30 and £40; Simon, between £18 and £30; and Pocket Simon £11 to £20.



Pocket Simon

Dark Tower is the most recent title in Milton Bradley's electronic range. It is more than just a game — it's an experience. Record your moves on the computerised control centre as you enter this exciting world of fantasy. First to travel around the board and storm the Dark Tower is the winner.

Price, between £29 and £40.

Continued on Page 88.



Milton Bradley's Bigtrak



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CVG

SANTA'S CHOICE

continued from page 85

Master Challenge by Peter Pan is an electronic quiz. Plug the Master Challenge computer into the quiz folder and dial any of the 1001 questions. Select your answer from one of four alternatives and the computer will tell you if you are right or wrong. It comes complete with cartridge number 1 with 1001 general knowledge questions and costs between £14 and £20 while Cartridge Quiz books are priced between £3.50 and £5.

Computer Battleship by Milton Bradley was the first electronic game brought into the UK. This is a game with 'live' action and sound. Hear the hunting of the sonar, the whistling of your missiles and the explosion of a direct hit. Claim victory with three 'whoops' on your destroyer's siren. Price between £24 and £40.

TABLE-TOPPERS

In the beginning there were the hand-held games. Initial sales were tremendous but as all manufacturers, especially those in the Far East, jumped into this market there was tremendous overproduction and 'dumping' occurred, killing the market more-or-less overnight. The sport orientated items were never a huge success and retailers, in an effort to reduce stocks, discontinued the sports lines, this made the other items look well overpriced.

The hand-held game was followed by the table-top version, firstly space war items and then arcade

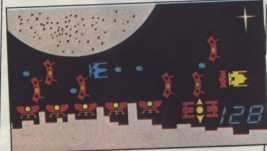
games in a reduced form. At the same time the miniature pocket games (credit card size and calculator size) entered the market, although once again we are going the way of hand-held with a lot of poor quality Far Eastern items pouring into the country.

Make sure the graphics are good (as television games cartridges) and the sound reproduction excellent. Games with varying skill levels are obviously better and the games that can be played using a mains adapter are the most sensible (batteries are expensive and these games "eat" them).

When buying, be careful, make sure the bargain has all the above, as the cheap imports that have been dumped very rarely offer the facilities mentioned.

Among the best buys in this field are: **Astro Wars by Grandstand**. A table top game featuring on-screen colour with a special magnifying effect. Five lines of action with multi-coloured invaders and futuristic sounds just like the real arcade game. It has four levels of play and was voted best new toy of 1981 by the National Association of Toy Retailers. It costs between £22 and £30.

Taking you back in time is **Caveman by Grandstand**. A table-top game with multi-coloured display. Control the caveman stealing eggs from the dinosaur, whilst avoiding his attack, features include dive bombing primitive birds, an axe attack, a volcano eruption and a fire breathing monster. Two levels of play and four lives, priced between £19 and £29.



Scramble

Scramble by Grandstand is an obvious follow-up to **Astro Wars**. It is based on the popular arcade game of the same name, and has a multi-coloured display with new exciting sound effects. Four separate phases including a meteorite attack, a space squadron attack, flight through the black hole and a base station attack. Costs from £22 to £30.

Defender by Entex is a hand-held version of the Williams arcade game that has long been an arcade favourite.

Defend your planet against many alien craft in a fast-moving rocket ship. It features asteroids, aliens, humanoids and a variety of hazards as well as twin radar spotter screens, multi-colour display and sound effects. Price between £27 and £35.

Munchman by Grandstand is a table top game with multi-coloured display. As with the hugely successful **PacMan** game you attack the monsters by eating the power food to score points. Two skill levels and costing between £18 and £24.

PacMan 2 by Entex is the hand-held version. A multi-coloured game of strategy and tactical pursuit. Six skill levels in the single player mode with two skill levels in the two player mode. It costs between £24 and £30.

Galaxy Invader 1000 by Computer Games Limited (C.G.L.) is a hand-held game with three skill levels and great sound effects — score

extra points shooting down the U.F.O. Price between £18 and £21.

PLAY SCHOOL

Electronic technology is now used in so many areas that it is no surprise at all that the expansion of the 'chip' in pre-school toys has occurred.

From a few years ago, when Texas Instruments entered the market, the idea of a small child learning from an electronic aid has become more-or-less standard. The early days of an American voice have practically disappeared and Milton Bradley have now entered the market.

The educational toy is now being used in many schools and is as much fun for the adult as the child.

Among the **Best Buys** are: **Speak and Spell by Texas Instruments**. The first of the 'talking' toys, it also has built-in extra games. It is a fantastic learning aid with computer brain and electronic voice. Pronounces words letter by letter — rewarding when right, correcting when wrong. Priced between £33 and £43.

Little Professor by Texas Instruments is a child's first electronic learning aid. Now up-dated to a LCD display, it has thousands of maths problems at four levels of difficulty. Priced between £9 and £12.

Major Morgan by Playskool is Milton Bradley's first entry into the pre-school electronic market. To play sim-



SANTA'S CHOICE

ly insert one of the song cards and touch the electronic keyboard according to the letters, numbers, colours or shapes shown. It is priced between £7 and £12.

Maximus by Playskool is the computer companion for learning and fun. Green "tick" lights up for correct answer, red "cross" with a buzz when wrong. Plays tune when all correct. Four different activities — spelling, match-ups, counting and music. It costs between £8 and £14.

You will notice from the wide range of price gaps, it pays you to shop around and find the best price.

JUST WATCH IT!

A deluge of games for the Atari VCS system is ready to descend on to the UK market.

They are manufactured by a host of new independent US software houses, which numbered 17 at the last count.

While the prospect of all these new games is an exciting one, it is necessary to add a word of warning. Not all of the games advertised have been properly converted to the UK market.

The American television system is not compatible with the British system and any cartridges produced over the Atlantic have to be converted.

Otherwise they will not offer as accurate and clearly defined graphics as they should, they may be slower and the colour usually suffers — in extreme cases, the cartridge will not produce colour at all.

The normal process is for an American company to make a deal with a UK distributor to release his cartridges over here. These are then converted and soon find their way into the shops.

Among the ranges currently out over here are: Parker, distributed by Palitoy; Imagic, distributed by Adam Imports; Appollo, distributed by Vulcan Electronics and Activision, by Computer Games Limited.

But cartridges that are available in the US can still be shipped over unconverted and sold here.

The technical reason why



WE'RE PLAYING FOR TIME . . .

Pocket size game-watches are coming down in price and there will be an abundance to choose from this Christmas.

A conservative estimate puts the number at 80 different varieties in numerous ranges. These can look very impressive with all sorts of weird creatures inhabiting the screen. And some of the recent batches even have storylines to back them up, like Hanime's Sleeping

Beauty for example.

But, the important thing to look for is that elusive addictive quality which prevents you from picking the game up "for just two minutes". Simple games usually work the best in this format.

Among the best games are: Popeye from C.G.L. which sets you the task of catching articles thrown by Olive Oyl, while Bluto tries to knock you into the harbour. Price about £19.95.

these cartridges are not compatible is due to the different electricity supply standards which apply in the US and in Britain. American TV sets run off 70 Hertz while British sets run off 50 Hertz.

This causes cartridges which have not been modified to roll continuously as if the TV set were faulty.

In order to correct this cartridges need to be fitted with a stabilisation circuit to hold the picture stable.

Questions to ask your dealer before you buy are: "Is it a

British standard PAL cartridge" or simply, "Is it compatible with British television sets".

Best of all ask to see the game actually working before you purchase the cassette.

System X is a hot topic in TV gaming. Atari is still not telling its public much about the machine which is due to supersede the incredibly successful Atari VCS.

We have managed to glean a picture (right) and a few facts about this machine which has earned itself the nickname "the Super-game".

SPACE WARP

A recent addition to the pocket l.c.d. games with time facility is the watch with game facility.

Watches have always suffered from a high reject rate and obviously with the game facility added, rejection rates have increased. Watches are now much bulkier but sales have gone well due to the novelty of the item.

Again, space games are among the most popular with game watch fans.

Ones to watch out for here are: **Game Time by C.G.L.** The Space Invader type is by far the best seller and can be played with or without sound effects on the l.c.d. playing area. Cost, between £20 and £30.

Remote control joysticks are one feature on the new system and it will also have a tracker-ball control.

There will be 12 cartridges in the initial range, including sports and familiar arcade titles and the graphics will be similar in detail to the cartridges produced for the 400/800 computers.

Among the graphical frills will be clouds of dust produced by runners in the sports cartridges. And it is rumoured that there will be a plug-in attachment which will allow the system to run existing Atari VCS cartridges.

Beating the Atari System X to our selves will be Colecovision's new TV games centre, due out early in 1983.

It is being marketed in this country by Ideal and is promising a big improvement in game centre graphics.



continued on page 91

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*Requires 8K minimum.

SANTA'S CHOICE

Continued from page 89

OPENING MOVE

What questions should you ask when buying a dedicated chess machine?

Most important is speed of response, if you want a machine which plays as fast as you do; you will find it irritating to sit and watch it struggling over an obvious move.

Ask for a shop demonstration, not just a talk through the instruction booklet; try and find out how the machine responds to an opening variation and how easy it is to set up a position on the board.

For models destined to spend long periods away from power points, ask how long the batteries last — two hours is of little use to anyone. Examine the display or the pieces to see if you can distinguish them easily, find out about a guarantee — two years is what you should expect for the powerful machines. Remember these machines still have a 2-4% failure rate.

If book openings are important to you — if you take chess seriously they will be — ask how many the computer can play and see if you can make anything of the instruction manual. Then start checking the price.

CHESS CHAMPS...

The Scisys Mark VI Chess Champion came into the country last month boasting a brand new program which excels at Sicilian Defence and plays a tight game with the emphasis on strong pawn centres.

At £210 for the machine with LCD chess board dis-

Does the computer owner still have any use for a dedicated chess-playing machine?

With some extremely powerful chess programs for home computers being produced in ever-decreasing memory, it is all too easy for the computer owning chess player to scoff at the more-expensive dedicated machines.

Sargon II may be more than a match for most of us but Terry Pratt looks at the current state-of-the-art of consumer chess machines.

play, or another £125 if you want to attach it to a sensory board, it does not compare favourably with a Sargon II program on your home computer.

It would beat Sargon II in a straight contest, although — unlike its Mark V predecessor — it has not been specially designed to defeat other machines.

It was one of those inevitable ironies of the computer age that machines designed to play against humans first had to prove themselves against other machines. The Mark V did this by going out of "book" as soon as possible, and so throwing its opponent back on to its own resources early in the game.

"Book" openings are one of the main advantages of the dedicated chess machine, over its home computer rivals. All the top class chess machines have a huge repertoire of stored book openings.

As casual chess enthusiasts are more likely to study the game than actu-

ally playing it, they usually have a strong knowledge of the openings that top players use and how to progress to a reasonably even middle game in many of them.

They invariably have developed their own favourites and a computer which will take them down these familiar paths, responding quickly because it is just pulling moves out of memory, will enable the player to explore and examine his favourite openings further.

One of the Scisys' main rivals at this level is the Sensory 9, from the challenger range, distributed over here by Computer Games Limited.

It accepts a library of mod-

the dedicated machine have? Well a quick look through its extras will show a few. These include: Analysis, where it gives your best move and prints out a numerical comment on the state of the game; Comment, where it will tell you dis-arming things like "mate-in-four"; Draw, it may accept your offer of a draw; in problem mode it will sift through the combinations for the best moves; it can keep 12 simultaneous games in memory to play.

It can be educational. The Scisys comes with a booklet size set of instructions and Vulcan Electronics, which markets the game in the UK



ules, programmed to keep it up to date with the latest innovations of computer chess and store various book openings — the first two cartridges gives an effective 27,000 opening moves for its owner. The machine costs £149.95 and its cartridges cost from £59.95.

Sounds like a good idea when you consider how chess programming is constantly being updated and experimented on. Unfortunately, although the programmers themselves are naturally excited by tiny improvements in the computer's play, the benefit as seen from the usual chess player's point of view are negligible. The fact is that computers, without taking inordinate amounts of time, or being attached to walls of mainframe memory, are still groping just below top club player standard and will be for some time.

What other benefits does

claim it is very educational. It is. In auto mode it will happily play itself and display its profound knowledge of openings with a tendency to veer towards the Sicilian.

Computer Games' Voice Sensory Challenger costs £199.95 and will also keep you aware of what is going on with phrases like: "Your move" and "Mate in two" which can be irritating and is probably the closest any chess machine will ever get to gamesmanship.

Of course these models plug into the mains and are hardly portable in the same way as the old travelling chess sets.

The Hanimex costs £30 and is a marvellous buy for the keen chess beginner.

Also its batteries last a very impressive 50 hours.

The Mini-Sensory Chess Challenger costs £49.95 and looks just like the old travelling sets, the Scisys Executive costs £69.95.



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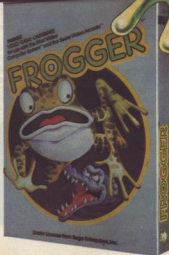


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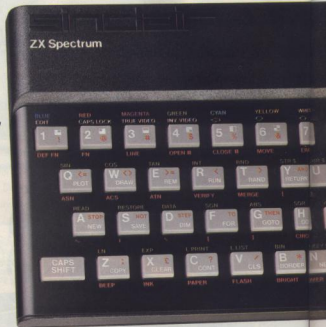
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Ready to use today, easy to expand tomorrow

Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white).

Employing Sinclair BASIC (now used in over 500,000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming. Whether you're a beginner or a competent programmer, you'll find them both of immense help. Depending on your computer experience, you'll quickly be moving into the colourful world of ZX Spectrum professional-level computing.

There's no need to stop there. The ZX Printer—available now—is fully compatible with the ZX Spectrum. And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232/network interface board.



Key features of the Sinclair ZX Spectrum

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ZX Spectrum software on cassettes – available now

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RS232/network interface board

This interface, available later this year, will enable you to connect your ZX Spectrum to a whole host of printers, terminals and other computers.

The potential is enormous. And the astonishingly low price of only £20 is possible only because the operating systems are already designed into the ROM.

sinclair

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The ZX Printer – available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.



The ZX Microdrive – coming soon

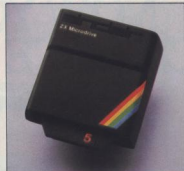
The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing.

Each Microdrive is capable of holding up to 100K bytes using a single interchangeable microfloppy.

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All the BASIC commands required for the Microdrives are included on the Spectrum.

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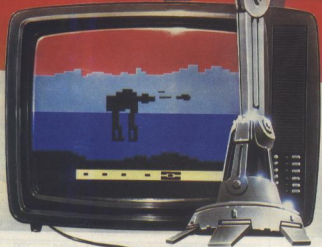
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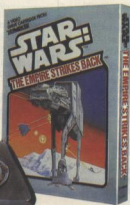
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If you think that four games on one side of a cassette tape sounds too good to be true then you are proved right by Games Pack 3.

Mind The Meteors challenges you to steer your spaceship safely through a meteor storm. Trouble is the meteors are not meteors at all but simply a number of stationary asterisks dotted around a rectangle which occupies exactly half of the screen.

The spaceship is pretty unimpressive too. Just a tiny little arrow. This game was so easy I mastered it on my fifth go and found it so boring from then on that I quickly loaded the second game on the tape — Daylight Robbery — to see if it was any better.

Alas no: The game offers an interesting idea — you have to raid as many safes as you can and get away with the cash — escaping through the maze exit, before the guard can grab you. As with *Mind The Meteors* the game was spoiled by hopeless graphics. The safes are dollar signs, you are represented by the letter O, the guard by an I, and as with all four games there were no sound effects. This was also a frustratingly slow game to play.

Battleships is a good game, but I did not feel that this computer version was any

BEWILDERED, BOTHERED, AND BAFFLED

You would think wouldn't you that a well known TV quiz programme such as Mastermind would convert well to a computer game.

Strange then that Mastermind — the latest offering from Commodore — should be such a poor offering.

Here are just a couple of examples.
Question: What have A.A.B. and O in common. If you think the answer is types of blood or blood type you would be wrong. The answer is blood types. Therefore the answer given by yours truly was wrong according to the book of Commodore.

I wouldn't mind if the thing was at least consistent, but a two word answer was given as wrong if the answer in the data base was one word, ie. Marquis of Queensbury: wrong. Queensbury: right. Fly Fishing: wrong. Fishing: right.

But just when you think you have cracked it and answer Weismuller for the first Tarzan you find you have been double crossed and the correct answer is Johnny Weismuller.

GAMES PACK 3

better than playing the game with a pen and paper. The submarines, destroyers, cruisers, and carriers were all represented by the letters 'S', 'D', 'C', 'A' — a bit disappointing considering the exciting comic-style illustration of a submarine on the cassette inset.

The final game on this cassette was Invisible Invader which enables you to draw long lines of asterisks across the screen. Again the graphics are disappointing — your "spacecraft" is an asterisk. The "Invader" as the title suggests is invisible, which is just as well really, for if it had been visible I feel sure it would have been an asterisk too.

Games 3 is just one of a series of four games packs from ICL for the Sinclair Spectrum. The cassette is available from larger branches of W. H. Smith at £4.95. If the others are all like this then games packs one to four certainly won't be on my shopping list this Christmas.

- Getting started 7.
- Value 2.
- Playability 1.



I am not sure how many questions there are on each data tape but after a while life gets boring seeing the same questions appear time and time again when picked at random.

BBC Mastermind runs on a Vic 20 with a 8K or 16K ram pack expansion. It is in the shops now at £9.95 for the basic package plus £1.99 for specialist subject tapes.

- Getting started 7
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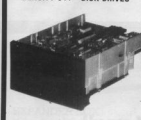
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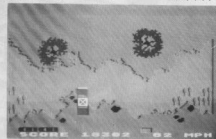
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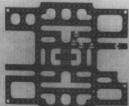
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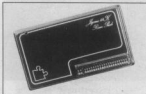
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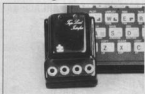
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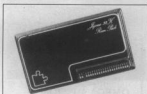
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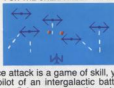
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Points: Ace = 1 or 11, Jack, Queen, King = 10.
Scoring: 21 points with 2 cards, or you automatically win.
Scoring: 21 points or less with 5 cards — you automatically win.
Zero — the computer wins.
Your key is automatically adjusted win or loss. If you lose all your money — game ends.

DECIPHER:-
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You have to make a line of four squares — horizontally, vertically or diagonally. BEFORE the computer starts, telling them to take a square (square can only be placed at the bottom of the grid, or on top of another square). Keep hit the number key of the colour you want your square dropped in then hit the return key.

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The Vic Multisound Synthesiser is very flexible and can be played in more ways than can ever be explained here, to create music and special effects. For example, create any tune, up to 255 notes (after following appropriate instructions), then press "F1" or "F3", then key "9" and enjoy the added effect. Now hit "4", listen to the difference. For a surprise — hit "1". Now add a melody over the top — hit key "8" then "7" — now play a melody, or experiment. Have fun!

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